To my family, the Tarters, who love Haiti
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Charcoal in Fondeblan, by the side of the road, and in one of many trucks that leave the area daily.
Haitians continue to experience mutually interacting human and ecological crises related to widespread deforestation. In this thesis, the history of Haiti’s deforestation is examined using a ‘political ecology’ approach. Such an approach examines politically-induced processes of deforestation at various spatial and temporal scales. The political component of the political ecology approach employed here is expanded to include policies and development projects.

Tree-planting has been seen by both ecologists and anthropologists as one method of simultaneously ameliorating human misery and preventing further ecological damage in Haiti. Most previous large-scale tree-planting projects in Haiti have failed. One project designed and vetted by cultural anthropologists achieved notable success. Most evaluations of this project are overarching and broad, and measure success primarily in the number of trees planted or in the number of individuals participating. Less common are site-specific outcome-evaluations that provide more qualitative assessments of the project, contextualized through time and space.

Therefore, this thesis is a site-specific outcome-evaluation of this earlier tree-planting project, some 30 years after the initial seedlings were delivered. The research
presented here was generated in the exploratory stage of a larger research schedule. Conclusions are drawn based on qualitative and quantitative data gathered from interviews conducted over two months, during summer 2009. Data were gathered on a series of cultural, socioeconomic, and ecological factors thought to influence continued tree-planting. Preliminary hypotheses were generated based on an extensive literature review and used as points of inquiry. Data were analyzed with SPSS.

The logistic regression indicated four variables of statistical significance correlated with farmers’ decisions to plant trees: (1) the number of different tree species already on household land; (2) whether or not farmers participate in agroforestry practices; (3) the number of different types of animals a household keeps; and (4) how trees rank in overall household livelihood strategies. These variables and others are treated in a mixed discussion and analysis format. Preliminary hypotheses are accepted or rejected based on the analysis. Recommendations are made for both further research and future tree project design in Haiti.
CHAPTER 1
INTRODUCTION

A Long Personal Journey

This thesis represents the culmination of a long personal journey and the partial fulfillment of a childhood dream. I was born in Haiti in 1978, the year after Dr. Gerald F. Murray completed his dissertation on Haitian peasant land tenure, and the year before he wrote a report that would become the theoretical backbone of the largest tree-planting project in the history of the country. As the child of development workers in Haiti in the 1970s, I was exposed to many different ideas about the contentious subject of development. My own father’s maverick thesis was on participatory communication through an audio cassette program that he designed to “enable the Haitians in the communities served by the project to participate in the planning and execution of community development objectives that would bring them a better quality of life, by their own measure” (Tarter 1985:2). I have always been proud of my father’s *modus operandi* of replacing the foreigners on his teams—and eventually himself—with Haitians. Yet my father is a rare case, and through scholarship I also became aware of questionable practices and policies in the development world.

Family trips between my birthplace of *Okay*¹ (Les Cayes) and Haiti’s capital city of *Pòtoprens* (Port-au-Prince) profoundly impacted my childhood. Our family had some loose roots in the Pacific Northwest—an area well known for its rich forests. The juxtaposition of Haiti’s ecological situation against the forests of Washington State led early on to an unusual sense of distress and a desire to help with the situation.

¹ Kreyòl (Haitian Creole), the language of 90% of the population, is privileged over traditional French location names throughout this thesis.
When I left Haiti around the age of 15, a childhood friend and I made a pact that we would return to Haiti one day and try to contribute to the deforestation situation in a positive way. Childhood dreams of reforesting Haiti slowly gave way to more pragmatic approaches to a complex situation. I decided that education was my best bet toward accomplishing something meaningful related to tree-planting in Haiti. I earned by BA from the University of Washington’s Program on the Environment—an interdisciplinary program that uses the natural environment as an integrating context.

Several years later, disillusioned with academia and traveling through India, I discovered Dr. Murray’s writing on Pwojè Pyebwa\(^2\) (the Agroforestry Outreach Project). I remember sitting in a small internet cafe on the banks of the Ganges River and wondering how I had missed this project. I was fascinated by the idea of an anthropological approach to reforestation in Haiti—applied anthropology. I wrote to Dr. Murray and discovered more good news. I learned that Dr. Michael Bannister—a forester who had worked for many years on the project—was also at the University of Florida. The combined expertise of these gentlemen and my eventual receipt of a U.S. Department of Education fellowship to study Kreyòl (Haitian Creole) sealed the deal. I moved to Florida and commenced the research that is presented in the following pages.

**A Brief Note on the Recent Earthquake in Haiti**

It is no overstatement to say that Haiti has experienced major changes since the earthquake of early 2010. Much of this thesis was written before that time. Perhaps more than ever before, development agencies involved in the process of “rebuilding”

\(^2\) Pwojè Pyebwa, Haitian Creole for “tree project,” is used throughout this thesis to refer to the Agroforestry Outreach Project. It is the name that most Haitians know the project by.
Haiti are at an ideological crossroads—they may chose to repeat the mistakes of the past, or to learn from the few models which have been shown successful. The findings presented in this thesis are not only salient but potentially applicable as the country begins the long process of rebuilding. Although the earthquake is not the focus of this thesis, nor does its occurrence negate any findings herein, it is mentioned from time to time when applicable to the research presented in the following pages.

**Haiti in 2010**

At the close of the first decade of the new millennium, looking backward with the hindsight afforded by the passage of time, it is clear that the lives of billions of people on the planet continue to be impacted—and not always for the better—by the policies and subsequent projects of large development agencies. In our hemisphere, Haiti has been a major recipient of such projects.

What has become of Haiti—that small island nation commonly heralded for being the site of a successful slave rebellion that led to the formation of the western hemisphere’s first independent black republic? In addition to receiving elevated attention for its historical significance, Haiti’s concurrent woes are widely lamented in academic arenas and in the mainstream media. Newspapers and scholarly journal articles, theses and dissertations, books, government reports, and publications from nongovernmental organizations often begin their literature by labeling Haiti as the poorest country in the Western Hemisphere. The case for this unfortunate label is commonly made by citing Haiti’s low gross domestic product, high rates of infant morbidity and mortality, low rates of life expectancy, disease, illiteracy, malnutrition, poverty, crime, political violence, out-migration, and a host of other indicators. This
representation of Haiti and essentialization of Haitians as “poor” ignores the many riches of the country and the people.

**Points of Theoretical Departure**

Two discourses in particular are commonly evoked in ascribing root causes to Haiti’s current condition—politics and ecology. In the case of the former, emphasis has been placed on Haiti’s history of slavery and subsequent liberation, foreign interventions, crippling debt, dictatorial and tyrannical oppression, insidious development agendas, and more recently, glimmers of hope for inclusive democratic governance. In the case of the latter, deforestation has been the most commonly noted, with the Haitian peasant as the instigator. The mutual influences of ecology and politics in the case of Haiti justifies why a political ecology approach is the primary point of theoretical departure used in this research.

**The State of Haiti’s Ecology**

Haiti, often portrayed as an environmental disaster, is fast-becoming the world’s poster child of a worst-case ecological scenario—a modern day Easter Island (Diamond 2005). It is commonly held that Haiti’s ecological woes are tied to wide-scale loss of vegetative cover and particularly tree loss (Lewis and Coffey 1985; Howard 1989; Murray 1994). Some estimates place forest cover in Haiti at 3% or less (Diamond 2005; Swartley and Toussaint 2006). Severe deforestation has contributed to related and mutually influencing ecological and human crises. In the case of the nation’s ecology, massive deforestation has either fueled or added: (1) damage to riparian systems and the soil-silting of unique coral reefs; (2) loss of endemic flora and fauna; (3) increased

---

3 The political ecology approach is elucidated in Chapter 2.
frequency of landslides; and (4) loss of valuable topsoil (Murray 1984; Howard 1998; Swartley and Toussaint 2006; Smucker et al. 2007).

At the time of this research, it is as-of-yet uncertain whether the extent of the wide-scale destruction caused by the 2010 earthquake in Haiti was exacerbated by earlier deforestation or loss of vegetative cover. Certainly the trend to abandon the countryside in favor of the capital city can be partially contributed to wide-scale deforestation that rendered already weakened soils infertile. Multiple political processes also contributed to urban-bound migration. The net result was an overcrowded capital at the time of the earthquake.

The potential also exists that the earthquake has increased the likelihood of future landslides, by loosening mountainsides in rural areas that have already been rendered unstable by earlier deforestation. Future rainy seasons will provide an indication of the extent to which the earthquake has affected the ecological situation.

**Human Crises Related to Haiti’s Ecological Devastation**

The human crises connected to Haiti’s ecological crisis are insidious, demanding further explanation. In Haiti, approximately two-thirds of the population has traditionally relied on cash-cropping as a primary livelihood strategy. Acknowledging accelerating urban migration in Haiti during the last fifty years, the earthquake of 2010 appears to be at least temporarily reversing this trend. Media outlets have issued reports of large numbers of the capital population heading back to the Haitian countryside. Early reports estimate as many as half a million Haitians have left Pòtoprens and its peri-urban areas. Recent calls to the village where I this research was conducted suggest that many households have doubled or tripled in size since the earthquake. Whether this is a temporary phenomenon or a permanent one remains to be seen. Whatever the
eventual effect of the earthquake on internal migration, a recent estimate suggests that a two-thirds ratio of Haitians living in rural areas and relying heavily on cash-cropping still holds true (Verner and Egset 2006). Therefore, the loss of top-soil and the degradation of agricultural lands caused by deforestation contribute to and are reflected in: (1) malnutrition; (2) hunger; (3) increased poverty; (4) emigration; and (5) increased vulnerability to tropical storms, hurricanes, and potentially earthquakes (Howard 1989; Wilentz 1989; Catanese 1999; Cárdenas 2008).

**Tree-Planting – A Commonly Proposed Solution**

Many actors involved in Haiti—from ecologists to anthropologists—consider projects aimed at curbing soil loss, implementing hillside stabilization measures, and restoring and protecting watersheds as crucial components to addressing Haiti’s related human and ecological crises (Murray 1981, 1984; Bayard et al. 2005 Smucker et al. 2007). Unfortunately, well-intentioned efforts to help have often gone astray, as evidenced by Haiti’s nickname in some development circles as ‘the graveyard of development’—a place where development projects go to die. The history of failed development projects in Haiti is far more often the result of both uninformed and predatory policies developed by outside “experts” with little knowledge of the country than the result of some condition inherent to Haiti itself.

A host of ecologically-oriented development projects have been tested in Haiti, with many early approaches focused on soil conservation through reforestation. These projects, failing to take into account key culture-specific considerations, have largely failed. One tree-planting project in particular is reported to have been highly successful. Designed and vetted by anthropologists, the Agroforestry Outreach Project, or Pwojè Pyebwa was an agroforestry tree-planting project funded by the United States Agency
for International Development (USAID), implemented primarily by the Pan American Development Organization (PADF) and CARE, and carried out through numerous nongovernmental organizations (Murray and Bannister 2004). Operating under various names, the project spanned a decade and involved an estimated one-third of the rural Haitian population (Murray and Bannister 2004). It is widely considered the most successful, large-scale tree-planting project in Haitian history.

**Research Objectives**

The research presented in this thesis was driven by three primary and complementary objectives. Understanding these objectives requires some further contextualization. One considerable criticism of Pwojè Pyebwa is that its success has largely been measured by the number of household participants and/or the number of tree seedlings distributed—by numbers served (Escobar 1991; Campbell 1994). Less commonly presented are diachronic, site-specific outcome-evaluations of the project, which depict changes to behavior in addition to ecological changes. Several reports on the project, including specific case studies, surfaced approximately five years after project commencement (Balzano 1986; Conway 1986b; Smucker 1988). Another overarching, multi-site report was produced approximately 10 years after project operations began (Smucker and Timyan 1995). Yet to the best of my knowledge, no anthropological site-specific outcome-evaluations have been conducted over a longer period of time. Therefore, the first objective of this research is to provide a comprehensive and encompassing site-specific outcome-evaluation of Pwojè Pyebwa, approximately 30 years after its commencement.

The second objective of this research is to contribute to the aging corpus of anthropological literature on human-ecology patterns and relationships in Haiti. The
scarcity of scholarly undertaking on this subject in recent years is likely the result of a combination of several factors, including long periods of perceived political instability and the more recent yet pervasive fear of kidnapping on the part of some scholars. It is possible that the earthquake of early 2010 will further exacerbate this gap. Therefore, the second objective addresses this gap, albeit as a drop in the proverbial bucket.

The third and final objective of this research can be understood in the context of its role as the exploratory stage within a larger research schedule. Thus, results from this research inform and direct the forthcoming explanatory stage, which will culminate in the doctoral dissertation of this researcher.

**Chapter Outline**

The structure of this thesis is simple; it contains seven chapters that proceed in logical and traditional sequence. Chapter 1 introduced the problem, relevance, and the context of the research presented in this thesis. Chapter 2 provides a brief history of anthropological theories on human-nature interactions, and justifies the political ecology framework under which this research was approached. Chapter 3 provides an in-depth literature review, divided into five sections. First, the reader is introduced to the history of tree-cutting in Haiti. Second, an examination is made of the ecological and human crises related to this deforestation. Third, the history of reforestation projects that attempted to address these crises are examined, along with reasons for their failures. Fourth, Pwojè Pyebwa is discussed. Finally, the literature specific to the site examined in this thesis is treated. Chapter 4 outlines the preliminary hypotheses (generated from the literature and informed by the theoretical framework), justifies the sample parameters, and describes the methods used for data collection and analysis. In Chapter 5, data are analyzed and discussed. Chapter 6 draws conclusions from the
data-analysis, relates these conclusions to the preliminary hypotheses, and summarizes
the findings in relation to the entire thesis. Chapter 7 concludes this thesis by offering
steps forward for future research and providing suggestions for future tree-planting
projects in the area.
CHAPTER 2
THEORY

Introduction

This chapter provides a diachronic view of some of anthropology's influential human-nature ideas of the 20th century. While making no claims to be comprehensive, it is nevertheless inclusive of some of the most influential ideas and paradigms put forth. Through what is largely an historical homage, the reader will become aware of the disadvantages and ultimately the reasons for rejecting the earlier approaches. Overall, this chapter should leave the reader with a clearer understanding of the theoretical approaches employed and how these approaches inform the critical examinations in the subsequent chapters and conclusion of this thesis.

Early Attempts at Examining Human-Nature Interactions

Within anthropology, some of the earliest attempts at examining the relationships between humans and their natural surroundings emerged out of the mid-20th century neo-evolutionary school of thought. Two pioneers of the neo-evolutionary human-nature approach were Leslie White and Julian Steward, though their approaches were notably different. White’s approach is referred to from here on as the “neo-evolutionary approach,” which viewed cultures as proceeding universally through a series of stages related to their ability to subdue nature for the purpose of harnessing energy. Steward’s more culture-specific and comparative approach, which he called “multi-linear evolution,” spawned the school of thought called “cultural ecology.”

The Neo-evolutionary Approach

At the heart of White’s and Steward’s notably different approaches to human-nature investigations is the idea that the ability to harness energy is the key requisite for
cultural change. According to White, cultural change occurs through the transmission—or the development—of technologies that allow for greater harnessing of energy (White 1943). White suggests of history that “with greatly augmented energy resources man was able to expand and develop his way of life, i.e., his culture” (White 1943:236).

Thus, culture advances as people acquire methods and develop mechanisms to harness the potential energy laying dormant in nature. Furthermore, cultures at similar stages of energy acquisition are likely to exhibit similar qualities. In his famous essay on energy and the evolution of culture, White used examples such as the introduction of an ax, the development of animal husbandry, the introduction of agriculture via the domestication of plants, and the harnessing of atomic energy in describing what he viewed as progressively upward changes to culture through improved technologies that subdue nature for the purpose of procuring energy (White 1943).

By way of this brief explanation, it becomes apparent that White’s neo-evolutionary approach is overly simple and ill-informed with its claims to universality. While it puts forth some concepts that may still be useful, it assumes a hierarchy of evolution that favors cultures with access to high levels of technology and the means to harness energy. Finally, White conceptualizes “culture” in the singular—as something which certain people have more or less of, instead of “cultures” in the plural—reflecting the diversity of human arrangements and expressions. Understood in its historical context, it is presented here as a relic of early anthropological attempts toward understanding human-nature relationships.
Cultural Ecology

While White believed in a progressive, universal, technology-driven evolution of culture, Julian Steward is distinguished by his belief that there is instructive value in comparing how different cultures react to their environments and their technologies in different ways:

The concept of cultural ecology...is less concerned with the origin and diffusion of technologies than with the fact that they may be used differently and entail different social arrangements in each environment. The environment is not only permissive or prohibitive with respect to these technologies, but special local features may require social adaptations which have far-reaching consequences. (Steward 1990:38)

The comparison of these locale-specific environmental adaptations formed the core of Steward's over-arching theory, which he called “multilinear evolution” (Steward 1990).

Going a step further than White, Steward recognized the mutual influences of technology, institutions, and the environment working together to create cultural changes.

Deficiencies in both Neo-evolutionary and Cultural Ecology Approaches

In common, both the neo-evolutionary and cultural ecology approaches fall short of properly addressing modern human-nature situations, because both are deficient in regard to two important variables: (1) ecological changes; and (2) external interventions—in forms ranging from projects as different as colonialism to development. It is worth briefly examining these two deficiencies in both of these approaches.

In the case of the neo-evolutionary approach, White acknowledged the potential influence of ecological change, yet rejected it as a factor for consideration when he stated that “no two habitats are alike; every habitat varies in time. Yet, in the study of
culture as a whole, we may regard the factor of habitat as a constant” (White 1943:230).

Following suit, Steward appears to allow the relegation of the natural environment to a constant when he states, “Since in any given environment, culture may develop through a succession of very unlike periods, it is sometimes pointed out that environment, the constant, obviously has no relationship to cultural type” (Steward 1990:42). Such dismissal of ecological change over time—relegating nature to a constant—seriously weakens the applicability of either approach to this research. It is now well known that all ecosystems are in states of flux. Nature, like culture, is not static. The problem is further compounded when we consider the fact that Haiti has undergone what some would term rapid ecological change—namely massive deforestation and the resultant myriad of associated ecological problems outlined in the introductory chapter of this thesis.

In the case of the latter deficiency, Steward appears to acknowledge the effects of outside interventions, at least in the form of colonialism, though not in the form of development:

[I]t makes a great deal of difference whether a community consists of hunters and gatherers who subsist independently by their own efforts or whether it is an outpost of a wealthy nation, which exploits local mineral wealth and is sustained by railroads, ships, or airplanes. (Steward 1990:39)

Here Steward seems to concede that his theory works best in what can only now be considered a hypothetical scenario. That is, while a cultural ecology approach might have worked well for a culture long-situated within an unchanging ecosystem and little affected by large outside influences, such cultures no longer exist—if they ever did in the first place. The far-reaching effects of changes to the global climate, and the process of globalization well illustrate the deficiencies of the traditional cultural ecology
approach were it to be attempted today. As both approaches are found to be deficient for the two reasons just outlined, I turn to examine other human-nature approaches offered by anthropology in the 20th century.

**Ecological Materialism**

The earliest approaches viewed nature as a constant—either to be harnessed for energy, or as a static contributor to the shaping of cultures. Neither gave full consideration to the influence of outside interventions. The latter half of the 20th century saw the emergence of ecological materialism as a new model for examining human-nature relationships. Drawing strongly on cultural materialism, the ecological materialist approach took important steps toward including the environmental as a contributing, changing, and malleable factor in human-nature interactions.

In essence, the ecological materialist approach seeks to explain certain sociocultural structures by eliciting their human-ecological functions. One example is Marvin Harris’s “The Cultural Ecology of India’s Sacred Cattle” (Harris 1966). His title is perhaps a misnomer—this work represents a clear departure from earlier cultural ecology approaches, and can perhaps be considered an ‘ecological materialist approach.’ In this essay, Harris convincingly argues that the sacred cow phenomenon of India is not due to Hindu spiritual strictures against bovine consumption, but instead is simply reflected in the religion because of the sociocultural and techno-economic benefits to not killing cattle (Harris 1966). Here, cattle are viewed as both a technology affecting the overall ecosystem, and also as ecological component in and of themselves. Thus, Harris suggests that Hindu culture—influenced by a techno-economic function—affects components of the Indian subcontinent’s over-arching
ecosystem. This is a departure from traditional cultural ecology, which employed a one-way street model of nature acting on culture.

Thus, a particular strength of the ecological materialist approach is that it transcends earlier ideas of nature as an undifferentiated and unchanging force that acts on cultures. Instead, it views nature as an ‘eco-system’ that can be differentiated into component parts, which in turn can be analyzed, eliciting relationships that influence and are influenced by human technologies and sociocultural activities. In this thesis, the ecological materialist perspective is employed for its structural-functional strengths in interpreting the results of this research. Nevertheless, with its primary emphasis on structure and function, the ecological materialist approach tends to neglect giving equal weight to the influence of outside interventions—colonial or developmental—on both ecology and culture.

**Murray’s Theoretical Contribution**

I view Murray’s unique theoretical contribution as situated at the crossroads of an ‘ecological materialism’ and the then-newly-emerging ‘political ecology’ approach (Murray 1987). Murray suggested a ‘domestication of wood’ process at work in Haiti, similar to the process whereby humans domesticated crops. In this scenario, wood is domesticated and grown as a cash crop. Murray expanded on components of this theory in other publications (Murray 1991; Murray 1997). In Murray’s theoretical contribution, one sees vestiges of earlier theories (such as White’s and Steward’s harnessing of energy) with strong undertones of structural functionalism and cultural materialism. Finally, Murray takes special care to highlight historical and political contributions to the current state of Haiti’s ecological situation.
Political Ecology

The political ecology model is currently employed within a variety of disciplines, though the term first surfaced in the academic literature considerably later in the second-half of 20th century, when introduced by anthropologist Eric Wolf (Wolf 1972). While the term “political ecology” started with Wolf—an anthropologist heavily influenced by the cultural ecology school of thought—the model as currently used in anthropology is clearly distinguishable from cultural ecology. Namely, it attempts to include politics as a force for equal consideration at multiple levels of analysis. Interestingly, Wolf acknowledged the influence of interventions years before he used the term “political ecology,” when he stated that “...the people now under anthropological scrutiny are in continuous interaction and communication with other social groups” (Wolf 1972:310). This acknowledgement is in line with the discipline’s gradual turn toward Marxist-influenced critiques during the 1970s and 1980s.

As politics and ecology are the most commonly evoked discourses ascribing the root cause of Haiti’s related ecological and human crises, it is naturally fitting for a political ecology model to be used as the primary theoretical point of departure in this thesis. Such an approach is complementary to the interdisciplinary nature of this research, which draws on insights from both the social and the natural sciences. The political ecology approach is further fitting because this thesis is presented as an outcome-evaluation of an ecology-related project in a country with a long history of political interventions, and based on a policy (read politics) developed by an anthropologist. Heavily influenced by Marxist thought, this approach may be viewed as a marriage between political economy and ecological materialist perspectives. Thus, it
acknowledges the multiple and mutual influences of politics, economy, ecology, society and culture in an iterative process, with each affecting the others.

**Operationalizing Political Ecology as Applied in this Research**

Because the political ecology approach is applied somewhat differently in various disciplines, and is defined differently by various individuals, it is essential to define the term for the purposes of this research.

In this thesis, the political component of the political ecology model is expanded to include: (1) exerted political power; (2) policies; and (3) development projects—often informed by policies that are politically-mandated. Here, some clarification is needed. ‘Exerted political power’ is extended to include colonialism, foreign occupation, foreign and national governmental meddling, and other similar interventions. ‘Policies’ is a category meant to be inclusive of national and international government positioning, such as migration and immigration policies, land reform policies, aid policies, embargo policies and similar policies. ‘Development projects’ are many in kind and scope, but here the term is limited to ecological restoration projects. More specifically, a tree-planting project that emphasized the tree as a cash crop is examined here. Certainly there are overlaps between these categories, and they are disaggregated here simply to illustrate the breadth the category is meant to include. Together, all three types of interventions are referred to collectively from here on as “politics.” This is particularly fitting in the case of Haiti, because as one anthropologist recently pointed out, the Kreyòl work *politik* means both “policy” and “politics” (Schuller 2009).

The ‘ecology’ component here is distinguished from a view of nature as an undifferentiated whole, and is viewed instead as a system which can be analyzed both
for its component parts and the sum of its parts. Human beings represent a particular challenge, as they are uniquely part of the ecological, social, cultural, economic and political components of this model.

Levels of Analysis

In traditional political ecology approaches, analysis happens at multiple levels—household, local, regional, national, and international. A comprehensive multi-level analysis is beyond the scope of this thesis. Here, the literature review is limited to examinations of how larger political processes at the international and national levels have historically affected Haiti’s ecology, economy, society, and culture at a much lower level. Policy developments are examined primarily at the national level for similar effects. The project component (Pwojè Pyebwa) is first briefly examined at the national level, and later examined for its effects at local and household levels. The data collected are site-specific, and therefore validity is strongest at the household and local levels. It should also be noted that Haiti has another rung of analysis that might be considered in other political ecology approaches:

In rural Haiti there is another social unit below the level of the village but above the level of the household. This unit is referred to as the lakou, best translated as “compound.” The compound is generally composed of the houses of elder parents and their married children who have decided not to build houses elsewhere. (Murray 1981:3)

Therefore, in the case of rural Haiti, the layers of analysis in an application of the political ecology model should consider the lakou (compound) level. This point is revisited in further detail in the methods chapter of this thesis. In summary, while the literature review attempts a multiple-level political ecology analysis, the highest level to which the conclusions and recommendations of this thesis are applicable is at the local level, and subsequent levels directly below—lakou and household.
Interdisciplinarity of this Research

This MA research was conducted through the interdisciplinary track offered by the department of anthropology at the University of Florida. Departmental policy stipulates that students pursuing the interdisciplinary route must take courses within another program or department. Furthermore, departmental policy requires a faculty member from the second program or department to sit as a member on the student advisory committee. In line with my interest in trees, ecology, conservation, and restoration, I chose to take graduate-level courses offered by the University of Florida’s School of Forest Resources and Conservation (SFRC). For the interdisciplinary member of my advisory council, I recruited Dr. Michael Bannister. Dr. Bannister currently works in SFRC and spent many years working on Pwojè Pyebwa in Haiti. Dr. Bannister made the first delivery of seedlings to my research site.

Departmental policy further states that of the 30 credits required for the M.A., nine must be taken within the secondary department. Thus, approximately one-third of courses taken for this MA are SFRC courses. These requirements were met by taking SFRC seminars on agroforestry, community forest management, and forestry field-methods. Such courses helped inform the ecological considerations of this thesis.

Conclusion

A successful approach to examining human-nature interactions needs to recognize the mutual influence of a variety of forces at play in the modern world. Such forces include ecological changes, politics, and the effects of human societies and cultures. In this thesis, I employ a political ecology approach. This approach has been presented as an effective marriage between political economy and ecological materialism. Ecological materialism has been defined, and its focus on structural-
functional examinations has been highlighted as its particular strength to be exploited for this research. This research is interdisciplinary, drawing on coursework from the School of Forest Resources and Conservation to inform the ecological components of the political ecology approach.
CHAPTER 3

LITERATURE REVIEW

Introduction

Much has been written about the deforestation of Haiti. The available literature on the subject can be conceptualized as falling into five broad categories: (1) reports and analyses commissioned by governments; (2) reports and analyses by bi-lateral and multilateral aid and development entities; (3) individually produced university theses and dissertations; (4) publications in natural and social science scholarly journals; and (5) historical accounts. The lion’s share of literature pertaining to Pwojè Pyebwa and to the research site in this thesis lies within the first, second and third categories. Thus, their predominance in my literature review is not a matter of privileging particular perspectives, but of pragmatics—it is a reflection of what was available to me at the time of this research. I treat literature from the third, fourth, and fifth categories in both tracing the history of deforestation and in detailing current country-wide ecological and socioeconomic conditions.

In examining literature pertaining to deforestation in Haiti through a political ecology lens, I begin by treating the highest rungs of analysis—international and national. I conclude by treating the lowest rungs of analysis, examining the literature specific to the research site—local, lakou (compound), and household. This downward, rung by rung approach will bring the reader from the far to the near, contextualizing the research site as a specific place in time. Thus, the outcome of Pwojè Pyebwa at this particular site can be viewed as shaped and influenced by an overarching series of historical and political events.
The far-to-near approach employed here starts with a brief history of political contributions to the deforestation of Haiti, through four distinct eras. After I bring the reader up to the current era, I examine the major vulnerabilities related to deforestation and experienced by Haitians. Next, I highlight literature that addresses the important role of trees in the Haitian peasant economy. Then, previous tree-planting projects are discussed, focusing on those factors which led to their wide-spread failure. I follow with a brief treatment of Pwojè Pyebwa, and end with the literature related to Fondeblan—the site of the research presented in this thesis.

**A Brief History of Deforestation in Haiti**

Traditionally, most authors have succumbed to the cliché of beginning their writing on Haiti by highlighting that the nation retains only 2% of its original forest cover. Equally cliché is the tendency to chalk up Haiti’s deforestation principally to the actions of rural Haitian farmers, who have cut trees either for agricultural purposes or for the creation of charcoal (e.g., Klein 1945; Hosier and Bernstein 1992; Van der Plas 2007). This approach is a vast over-simplification of a long deforestation process that has spanned five centuries. It has been noted that this tendency to overlook the history of the political contributions to Haiti’s deforestation is widespread (Murray 1991; Lindskog 1998). While Haitian farmer-driven activities have certainly contributed to the island’s deforestation, many areas of forests were cut in the 300 years prior to the slave revolt that resulted in the creation of the Haitian Republic. Other major epochs of tree-cutting occurred in the years that followed the Haitian revolution, due primarily to policies forced upon the fledgling Haitian Government. Deforestation in Haiti continues into the current decade of the new millennium.
In addressing the tendency to over-simplify Haiti’s deforestation, I focus on several key political events in the history of Haiti which contributed to deforestation. I make no claims to provide a comprehensive historical account. The purpose of this approach is simply to highlight the role of politics in the process. Likewise, I address current farmer-driven tree-cutting by framing it within the history of larger political processes at play, rather than dismissing it as the collective proceedings of an ecologically unaware peasantry. These objectives are accomplished by a reframing of Haitian history into the following four epochs which reflect key deforestation events induced by key political events: (1) the colonial era; (2) the post-colonial era; (3) the early 20th century; and (4) the last fifty years.

**Colonial Politics and Policies Leading to Increased Deforestation**

Historical and political developments and their consequent effects on Haiti’s ecology have been many. The parameters of this thesis prevent a thorough and detailed examination of the colonial period, which spanned nearly three centuries. Instead, several key developments related to tree-cutting in this period are examined. To begin with, it should be noted that the first hundred years after Columbus did not result in massive tree-cutting operations:

Spain and Spanish interests turned away from Hispaniola only a few decades after Columbus had reached the island and focused upon mainland America. Large parts of Hispaniola were left virtually unexploited during most of the 16th century with only a few coastal settlements (mainly on the southern coast) which had been established during the first years of colonisation [sic]. The western part of Hispaniola [modern day Haiti] therefore remained without significant colonial settlements until the end of the 16th century and the first decades of the 17th century. However, it was not until the 1660s that the population started to show a significant increase through emigration from France as well as from the African slave trade. (Lindskog 1998:73)
Thus, it was not until the latter part of the 17th century that major changes to Haiti’s ecosystems\(^4\) began. This is in line with a world-wide trend, whereby various colonial governments enacted policies and actions that constituted a drive toward land clearing and tree-cutting. In particular, the intensification of 18th-century agricultural activities in the Caribbean played a chief roll in deforestation (Lindskog 1998; Moya Pons 2007). Frank Moya Pons, a widely-respected Caribbean historian makes this point succinctly:

One of the consequences of the establishment of the new agricultural colonies of the Caribbean islands was the gradual replacement of natural vegetation with domesticated crops. Former jungle and savannas were converted into sugarcane fields or pastures, while in drier areas, tobacco fields alternated with cotton. (2007:95)

In addition to these lower elevation crops, trees were cut to provide fuel to cook sugar cane, and in the higher elevations trees were cleared to grow coffee (Catanese 1999). Added to the colonial agricultural factor were wood extractive practices, aimed at providing timber for European markets. “[A]ll of those French ships that brought slaves to Haiti returned to Europe with cargoes of Haitian timber” (Diamond 2005:340).

During the colonial period, several different policies were adopted by the colony’s governor in an effort to slow tree-cutting (Lindskog 1998). These policies experienced some success, as Lindskog reports that “from at least as early as 1740 wood was regularly imported from the American mainland” (1998:76). The effectiveness of these policies in the long term is questionable, as “huge areas of the colony continued to be deforested until the end of the French colonial era” (1998:76).

\(^4\) Here I disaggregate humans from nature, though recognizing the mass extermination of the indigenous people living on the island.
In summary, the time between Columbus and first half of the 17th century saw little forest-exploitation in what is modern day Haiti. The 18th century saw the most aggressive land-clearing and tree cutting during the colonial period, as various political powers vied for fertile lands to meet agricultural demands from the external export market. Countless other political processes and policies affected the process of deforestation during the colonial period, but are beyond the scope of this thesis.

**Post-colonial Tree-cutting**

The beginning of the 19th century saw the establishment of an independent Haitian republic, headed by Jean-Jacques Dessalines. However, independence did not halt the process of deforestation that Haiti was undergoing. Just a few years after the founding of the Haitian republic, several major state-level political events contributed to major increases in the cutting of Haiti’s forests.

One such increase started in 1804 when Dessalines, ruling by decree, enacted a policy that prohibited land transactions of any sort (Moya Pons 2007). Dessalines hoped to continue the plantation system enacted under the French. He proceeded to consolidate land under the rule of the Haitian state. According to Moya Pons, Dessalines “managed to place more than two-thirds of Haitian territory under state control,” where it would remain until the land redistribution policies of a later successor to power were enacted (2007:170). This later successor—Alexandre Petion—believing a more harmonious Haiti would emerge with high levels of individual land ownership, began a process of land redistribution that would forever change the landscape of the country:

Between 1806 and 1809, most of the cultivable land in the Republic of Haiti was privatized, and the economy of the region underwent a radical
transformation. In addition to the large plantations under mulatto ownership, a new free peasantry emerged, consisting of former slaves who cultivated family plots on the lands previously owned by their French masters. (Moya Pons 2007:171)

A second major wave of land redistribution occurred several years later, when Petion’s successor, Jean-Pierre Boyer, succeeded in unifying the northern and southern portions of the country, delineating a landmass that constitutes modern-day Haiti. This unification happened after the death of Henri Christophe, who had ruled as king in the northern portion of the country since independence. Boyer began the project of land redistribution in the north in a manner similar to what Petion had already done in the south. This high level of individual land ownership continues today, with nation-level data from censuses carried out in 1950 and 1971 suggesting between two-thirds and 80% of Haitians own land (Zuvekas 1978:77).

With these historical redistributions of land, the north began to experience a phenomenon already familiar in the south—a lack of labor (Moya Pons 2007:171-173). With so many new land owners, there were simply not enough hands to maintain plantations that could have previously procured products for an export market. The result was that Haitian farmers turned to subsistence farming and small-scale cash-cropping for internal markets, instead of producing for the external market as in the previous epoch (Schmidt 1995; Diamond 2005). Moya Pons reports that sugar exports from Haiti in 1823 dropped by a factor of ten thousand times from export levels in 1789 (Moya Pons 2007:173). Thus, the combination of new land redistribution policies with the resultant drop in labor availability in the newly unified southern and northern portions of the country were to the continued detriment of Haiti’s forests:
To compensate for the decline in plantation exports, many Haitians turned to logging and exported precious lumber and dyewood. The French had extensively exploited the mahogany forests of Saint-Domingue [modern-day Haiti] before the Revolution, but some uncut wood remained because Dessalines has prohibited logging. (Moya Pons 2007:173-174)

Yet small-holding Haitian farmers who turned to logging were not the primary cause of this continued tree-cutting. Wider-scale impacts were made at the hands of foreign companies in timber-procurement contracts with the new Haitian government (Murray 1987; White and Jickling 1995). Murray reports that during this period, “foreign lumber companies cut and exported most of the nation’s precious hard-woods, leaving little for today’s peasants” (1987:217).

Unfortunately, little of the money from such foreign industrial logging arrangements stayed in the hands of the Haitian government. The tree-cutting which began in the colonial period for the establishment of plantations—and was continued to a smaller extent by Haitian farmers—was driven industrially in newly independent Haiti to pay for foreign debts (Pierre-Louis 1989). That is, logging was promoted by a government which sought to sequester monies in the form of taxes which could address the debt. According to White, “early Haitian governments . . . encouraged logging to gain hard currency to pay off wartime indemnity to France” (White 1994).

The debt—due France in the amount of 150 million francs—was “astronomical for the Haitian national economy” (Moya Pons 2007:181). Initially agreed upon by the two governments to secure Haiti’s continued independence, it became a major strain on the economy for years to come. The debt prevented the establishment of well-functioning state institutions and contributed to the continued degradation of the land through over-farming and timber procurement.
The Haitian economy suffered tremendously under efforts to meet agreed-upon payments to France, taking out loans from French banks, and eventually renegotiating the terms of the debt in 1838 (Moya Pons 2007:182). Moya Pons reports that “legal exportation of mahogany almost doubled, surpassing 4.0 million cubic feet in 1842. Exports of logwood and dyewood followed the same trend” (2007:183). This intensification of tree-cutting demonstrates the unique way that politics at an international level (France) affected national deforestation rates in Haiti.

In summary, early national-level policies of land redistribution resulted in a turn to logging as Haiti was unable to maintain the export plantation system of the colonial period. Logging was further exacerbated by international policies—namely debt that France demanded from Haiti in lieu of revenues lost when Haiti gained independence. Other policies of the latter half of the 19th century added to the problem, though an exhaustive account is not possible here.

**Tree-cutting in the Early 20th century**

The extensive tree-cutting activities of the 18th and 19th centuries did not result in the total denudation of the country’s landscape. In particular, the southern portion of the country retained notable stands of forest cover well into the 20th century. An article from an early National Geographic Magazine (1920), with explorations made in the southeastern corner of the country, reported that mountains above 3,000 feet were “clothed with superb forests of Georgian pines, though the British concessionaires and the Haitian peasantry are rapidly and too recklessly felling these magnificent trees” (Johnston 1920:483). Of the country as a whole, an article in the same magazine
reported that Haiti’s mountains “some of which reach an altitude of nearly ten thousand feet, flourish extensive timber forests” (Unknown 1920:497).

The early part of the 20th century saw the American occupation of Haiti, from 1915 to 1934. Much has been written on this period, though it is uncertain to what extent the occupation directly affected tree-cutting. One source reported a reforestation project at the hands of the occupying force, though its scope and outcome I was unable to discover (Ferguson 1987:26). However, there were attempted agricultural reforms implemented by the occupying force, though they are largely considered to have failed:

Americans did make...a systematic effort to introduce modern agricultural techniques. This was extraordinarily difficult because of the tremendous gap between peasant technology and American technology. Peasants were basically skeptical about new machines and methods and about foreign white civilization in general. The experiences of their ancestors with French colonists and the more recent American forced-labor corvée of 1918-19 did not encourage confidence in the white foreigner’s methods and motives. (Schmidt 1995:181)

Another way in which the occupying American forces affected the country’s ecology has to do with the emphasis on infrastructural development in the capital city of Port-au-Prince (White 1994; Schmidt 1995). Such infrastructural development contributed to the centralization of the state, and resulted in pull factors from the rural countryside:

[T]he marines implemented a national plan for infrastructural development for all Haiti. Rural roads and bridges were built and health clinics established for the first time. Nevertheless, as the rural infrastructure developed, the centralization of economic and political power away from the rural sector and to the urban centers continued. The “center-periphery” system became more evident as a result of the occupation by the United States. The construction of roads and bridges enabled rural residents to travel more easily to urban areas and to better paying jobs and various amenities. (Catanese 1999:20)
The influx of hundreds of thousands of people into Port-au-Prince and other major cities resulted in a large urban demand for rurally produced charcoal—a trend that continues today. There are likely other ways in which the occupation affected the land and particularly tree cutting, but are beyond the scope of the “brief history” presented here. Suffice to say that any localized reforestation projects promoted by the marines were most-likely negatively offset by the urbanization trend they helped usher in.

At the close of the World War II, and approximately ten years after the end of the American occupation of Haiti, the Institute of Inter-American Affairs—under the auspices the U.S. Department of State—commissioned a report on the state of Haiti’s forests. The first sentence of this report is both telling of Haiti’s remaining forests as well as the underlying interests which likely influenced the commissioning of the report:

Forests in Haiti of commercial importance are practically non-existent. Small stands of pine, logwood, lignum-vitae and mahogany still exist in isolated spots, but the total area of these probably does not exceed 2,000 square kilometers (672 square miles). Most of this is located in the pine forests of the La Selle Mountains in the Southeast and in the more accessible mountains of the North. It would be an exaggeration to call this timber of commercial importance, although there are some trees of merchantable quality and size. The small volume and its inaccessible location make it of little importance except for local consumption. Timber exports are in insignificant volumes. (Klein 1945:5)

Thus, near the middle of the 20th-century, Haiti’s timber stands were close to being depleted. The lengthy period of timber exploitation by international companies was coming to an end. This is further evident by the dive of timber exports reported in the Inter-American Affairs report:

Maximum export of logwood for the country in past years was 120,000 tons in 1920. This was exceptional, as in most of the years up to 1930 exports averaged between 25,000 to 35,000 tons. Then volume diminished rapidly
until the years 1940 to 1944 when only 2,000 to 3,000 tons were exported. (Klein 1945:6)

While the report states that some of this later rapid decline in exports can be attributed to a fall in demand, the decreasing export trend is nevertheless telling of the overall depletion of the country’s timber stands. The author’s claim that the high level of timber exportation in 1920 was exceptional is baseless in the absence of figures for the period before—the middle of the 19th century to 1920. Klein may simply have been noting a rapid drop-off in exportation that corresponded with an exhaustion of timber resources during the latter half of the last century and the first decades of the 20th. Whatever the case, Haiti was now entering what I have framed as the final stage of primary forest loss, fueled primarily by agricultural clearing and charcoal production. That is not to suggest that these practices did not contribute to earlier deforestation, but simply to highlight that extractive practices of foreign entities were not as influential during this period.

**Deforestation in the Last Fifty Years**

Were one to visit Haiti any time during the last fifty years, without any knowledge of the long history of foreign political interventions in the country, it would be easy to mistakenly contribute the vast deforestation of the land entirely to the actions of rural Haitian farmers. Here I have endeavored to suggest that such a simplification ignores complex historical and political processes and policies. Yet while the colonial and post-colonial periods were major contributors to Haiti’s deforestation, it would be a mistake to ignore the effects of a population that has rapidly increased. State census data report an increase from approximately three million people in the 1950s to an estimated 10 million people at the time of this research (Zuvekas 1978:13; Smucker et al. 2007). The
influence of seven million new people in a country where two-thirds are estimated to be involved in rural agrarian endeavors cannot be overlooked.

Let me be clear in saying that Haiti’s increased population is not necessarily the direct cause of continued land degradation. Indeed, the myth of population growth within the proletariat as the primary contributor to ecological degradation has been adequately deconstructed. Nevertheless, under oppressive conditions, a large population can have an equally large net affect. The conditions may be exacerbated by high trends toward urban migration. As one respected political ecology theorist notes, “attention to high-density urban development and the associated energy costs and infrastructure demands of mega-cities have created justifiably renewed attention to population as an important driver for environmental change” (Robbins 2004:9).

According to a recently commissioned report, some key drivers of recent environmental vulnerability in Haiti can be attributed to “rapid population growth and unplanned urbanization” (Smucker et al. 2007:iii). Under different conditions, Haiti may very well have been able to absorb the seven million person increase without serious consequences for the land. Unfortunately, the political conditions that existed concurrently with the rapid growth in population resulted in an overall negative affect on the country’s ecosystems and the welfare of the vast majority of its inhabitants (Catanese 1999). As one research put it, “ecological disaster and rural demographic growth each in turn strengthened the migratory flow toward the urban centers, and most particularly toward Port-au-Prince” (Trouillot 1990:142). Therefore, the final epoch I examine is delineated by the last 50 years. This period of examination is marked by an immense population increase, general agricultural decline, rural-to-urban migration
trends, and by François Duvalier’s rise to power. The end of this period corresponds approximately to both the time period during which I conducted research in Fondeblan, and to the major earthquake event of January 12, 2010.

As with the case with the American occupation of Haiti, a great deal has been written on François Duvalier (“Papa Doc”) and his son Jean Claude (“Baby Doc”) (see for example, Trouillot 1990). The interested reader should have no difficulty finding literature on the subject. Here it will suffice to say that François Duvalier reigned as president for life in Haiti, from 1957 until to his death in 1971. He was replaced by his son, Jean Claude Duvalier, who also reigned as president for life until he was overthrown in a popular uprising in 1986. Much of the literature on the Duvalier era stresses that the proletariat bore extensive abuses, which served to solidify and maintain power in the hands of an elite few:

The regular assassination of opponents, predation on community organizations which did not explicitly espouse Duvalierist tenets, and the generalized and strong infusion of fear and distrust, all but eliminated leadership and organizational skills from the country. This repression and its attendant impoverishment also effectively attacked the very social fabric which is conductive to innovation and technology development. (White 1992:11)

Statements such as these are not hard to come by. Indeed, the human rights violations inflicted during this period have been well documented (Abbott 1988; Ferguson 1987; Trouillot 1990; Farmer 1994). Fewer references were found to actual ecological changes ushered in during this period. One researcher was able to report a historical phenomenon that occurred near the site of an ecological reserve where he was conducting research. Here we have a perfect example of politics of this era reaching into the realm of ecology:
During the Duvalier dictatorship, the long-term state lease was usually only one form of political connection that the local elites held. Many of these same local elites were also members of the Duvalier rural militia and many absentee leaseholders were politically powerful individuals who lived downstream. In this way, the roots of the Duvalier political machine reached all the remote forests of La Hotte. It created a rural elite and a system of forest exploitation based on sharecropping. Within decades after the state land lease system becoming [sic] the predominant means of accessing land, the forests were removed. (Monaghan 2000:137)

This particular account of the state of affairs during the Duvalier period could be described as a ‘reverse Robin Hood syndrome.’ In this scenario, Duvalier plays an antithetical Robin Hood—taking from the poor and giving to the rich. The merry men are played by those who profited by the politics, policies, and projects of the Duvalier regime. In this version though, there is no happy ending, and Sherwood Forest all but disappears.

There are other accounts of the affects the Duvalier family policies had on deforestation. Murray documented respondents along the Haitian-Dominican border reporting that “in the days of the Duvaliers a person cutting a single mango tree was required to plant 10 in its place” (Murray et al. 1998:17). If this policy were in place, it was more likely a border-localized effort of the Duvalier government, in an attempt to lessen widespread reports of stark environmental differences between the two countries—differences clearly observable along the border regions.

Like Murray, another researcher has noted the existence of laws against tree-cutting during the Duvalier period:

Prior to the fall of the Duvalier regime in February 1986, people had to have permits (and illicit payments to government agents) to harvest trees. This policy limited tree harvesting but also gave control to the local police. With the fall of Duvalier, this system broke down and tree harvesting, charcoal production, and wood transport exploded overnight. (White 1994:15)
White notes that while the Duvalier policies may have slowed tree-cutting, they placed little incentive on tree-planting. The result was that when the policy was removed, deforestation accelerated (White 1994).

If François Duvalier slowed tree-cutting, he did little to improve overall ecological conditions in Haiti, and his son Jean Claude offered few changes in this regard. As Catanese reports, “there were some perfunctory gestures but no substantive impulse [from Jean Claude Duvalier] to attend to the rural needs such as poverty and deforestation” (Catanese 1998:21).

The popular uprising that saw the end to the Duvalier regime did not result in any dramatic improvements for Haiti’s already severely degraded ecosystems (White 1994). Neither did the ushering in of populist president Jean-Bertrand Aristide. But one particular political event during this period did affect tree-cutting—and by extension, ecological degradation and exacerbated human misery. In the last century of the last millennium, the United States intervened again in Haitian affairs, in the form of an embargo sanctioned to restore democratically elected president Jean Bertrand Aristide to power after a military coup d’état unseated him. One unexpected—and one would hope, undesired—effect of the embargo was that elite segments of society that had backed Aristide’s ouster were able to shoulder the worst effects of the embargo, which were largely borne out on the proletariat. In particular to the analysis at hand, the embargo encouraged tree-cutting on the part of rural Haitians:

A more recent cause of tree cover removal was the embargo of 1991-94, when selling trees for fuel was one of the only options for cash (Swartley and Toussaint 2006:4).

While more trees were cut during this period, poor rural Haitians are reported to have fared quite well, as import petroleum based fuels were replaced with charcoal, bringing
higher profits to charcoal producers. The urban poor are said to have been the most negatively by the embargo (Catanese 1999:69-70).

In summary, tree-cutting in Haiti during this period was exacerbated by the policies of dictatorial governments that were extractive from the poor and generous to the rich—what I have referred to as a ‘reverse Robin Hood syndrome.’ Tree-cutting increased later in the period, ushered in by the politics and policies that resulted in a U.S. embargo against Haiti. These influences were set to the back-drop of immense population growth and wide-spread rural-to-urban migration. The combined result of these events and others was that rural Haitian famers cut more trees, either to increase agricultural yields or to make income via the internal charcoal and timber markets (Diamond 2005).

**Summary**

This brief history of Haiti’s deforestation brings the reader up to the time in which my research was conducted. A summary of a recent Haitian Ministry of Planning report in 2002 provides an excellent review: “From a forest cover of 90% in pre-Columbian times and 60% in 1923, Haiti now has true forest cover on only 1.5% of its land area” (Swartley and Toussaint 2006:22). In this brief history I have endeavored to suggest that while peasant tree-cutting has been the vehicle of much of Haiti’s deforestation, it has often been external politics and policies that have been the engine and driving force of this tree-cutting. This diachronic review divided the literature into distinct epochs, in order to highlight some distinct political events and policies that promoted deforestation. Other political contributions exist, but are beyond the scope of this thesis. The events chosen are illustrative of political influences on ecological conditions. With a basic understanding of some of the historical influences on Haiti’s deforestation, I turn now to
an examination of the intertwined ecological and human crises that have resulted in part from this wide-scale loss of tree and vegetative cover.

**Vulnerabilities Caused By Deforestation**

By now the reader should have a basic grasp of some key historical and political events that led to wide-spread deforestation in Haiti. I turn now to highlight some current and wide-spread results of this deforestation. I make no claims of ‘environmental determinism’ as such, though I do pay particular attention to the interplay between ecological conditions and their measurable effects on some aspects of Haitian society.

As suggested in the introduction of my thesis, Haitians and their environment are intertwined in a complex system that mutually contributes to ecological and human vulnerabilities. Here I disaggregate the people from the land, simply for the sake of examination. First, I briefly highlight some of the current ecological vulnerabilities caused by Haiti’s deforestation. Next, I provide a concise report of vulnerabilities experienced first-hand by Haitians.

**Ecological Vulnerabilities**

While the forests of Haiti are now mostly a thing of the past, many ecological treasures remain. There are at least 12 designated national park areas with ecological significance, and over 25 other areas have been identified as worthy of protection because of their ecological diversity (Swartley and Toussaint 2006:16-17). Several reports have highlighted that Haiti still possesses virtually untouched coral reefs of high ecological importance (Howard 1998; Swartley and Toussaint 2006; Smucker et al. 2007). Furthermore, the diversity of flora currently found in Haiti is said to be extensive (Smucker et al. 2007). According to one report, “in spite of severe environmental degradation problems Haiti has, together with the Dominican Republic, the second most
diverse flora in the Caribbean, after Cuba” (Swartley and Toussaint 2006:20). The same report indicates that Haiti is home to over 2,000 species of vertebrates—two-thirds of which are endemic; at least 236 species of birds—with an estimated quarter as endemic; and of the 217 reptile and amphibian species on the island, 98% are endemic, with fully one-third found only on the Haitian side (2006:20-21). In short, from an ecological point of view there are many reasons to protect the remaining stores of biological diversity in Haiti. These ecological treasures continue to be directly and indirectly threatened by deforestation.

Beyond the obvious loss of habitat that continued deforestation is causing for the flora and fauna of Haiti, issues related to water compound the problem. Widespread erosion has led to a situation where mountains are no longer able to efficiently retain water, resulting in negative ecological side-effects. In urban and peri-urban areas, particularly surrounding Port-au-Prince, inaccessibility to reliable water sources has led to a situation of over-pumping of underground aquifers, leading to salt water intrusion in the water table (Howard 1998:18).

Deforestation has altered the hydrologic cycle, causing rivers to run abnormally low or not at all during dry seasons, and has affected other natural drainage systems important for ecological functions (Swartley and Toussaint 2006:23; Smucker et al. 2007:9). Continued soil erosion and landslides have a “negative impact on biological diversity, as sediment in rivers smothers coral reefs and seagrass beds” (Swartley and Toussaint 2006:23). Silt in flood plains also causes a dropping of the water table, seriously affecting mangrove trees that rely on a higher water table (Howard 1998:18).
All of these negative ecological situations related to water are further compounded by Haiti’s two rainy seasons and the frequent tropical storms and hurricanes that visit the region (Cárdenas 2008). Suffice to say that the removal of trees and vegetation continues to have a negative net effect on Haiti’s diverse ecosystems and the biological diversity of the species they contain.

**Human Vulnerabilities**

The standard of living for many Haitians is negatively impacted as a result of deforestation and removal of vegetative cover. These impacts can be direct, but are often indirect and insidious. By the 1970s, a report on agricultural development, using data from Haitian government censuses, warned that “with the rural population continuing to grow and exerting more pressure on already overworked land, it does not require much perception to see that living standards for many Haitian families are likely to continue falling for some years to come” (Zuvekas 1978:327). Unfortunately, this prediction has largely been borne out. Amy Wilentz, in her now famous book “The Rainy Season,” personalizes this reality:

> You can read about deforestation and its effects in the books and pamphlets written by these experts, and then you can read about it in the faces and bodies of Haitian peasants. The bloated bellies and orange hair of the children of the Northwest are chapters in a long book about the failed bean crop, the persistent drought, the pitiful corn harvest, the lack of green pasture for livestock. The bony arms and legs of the mountain women, and their skeletal babies, are passages about the lack of water in the countryside, and testimony to drinking water that is stagnant, infested. (Wilentz 1989:246)

As a result of decreased fertility due to topsoil loss, many Haitians have abandoned the rural countryside en masse for the promise of urban jobs (Howard 1998:8; Smucker et al. 2007:9). Thus, there are combined “push” (degraded rural lands) and “pull” (the promise of urban opportunities) factors that have contributed country-
wide urban migration (Catanese 1999). Yet the crowded urban areas that confront rural Haitians who make this migration offer a standard of living considerably lower than rumored in the countryside:

The urban poor in Haiti often have no choice but to occupy the least-valued plots of land in disaster-prone areas such as riverbanks, unstable hillsides, deforested lands, or fragile catchment areas. In general, the densely populated slum districts of Haiti’s coastal cities are located to a large degree in flood plains. These populations are vulnerable to disease and natural disaster. (Smucker et al. 2007:9)

It takes no stretch of the imagination to picture who suffers the most when a tropical storm or major hurricane hits Haiti. By extension, the injuries and the large death toll from the earthquake of early 2010 were very likely exacerbated by the approximately three million Haitians living in a sprawling urban area originally designed for no more than half a million people. Furthermore, the highly stratified urban social pyramid that the rural Haitian enters provides little opportunity for upward mobility and ample opportunities to experience the negative effects of “trickle down poverty.”

Haitians who stay in the rural countryside do not fare much better. One report found that “most families who chose to remain in rural areas saw diminishing returns from their small farms, but had no immediate target for their frustrations” (Howard 1998:8). Rural areas continue to be susceptible to flooding and landslides from hillsides destabilized from tree and vegetation removal. Educational and employment opportunities in rural areas are either scarce or nonexistent.

In summary, loss of tree cover and vegetative cover has negatively impacted Haitian’s lives. Those that stay in the countryside continue to scratch out a living of low-value cash-cropping, mostly for the internal market. Those who brave the migration to
urban areas are subsumed in the vast and vulnerable slum areas, with no guarantees of reliable or well paying work, or of any improvement in their standard of living.

**The Role of Trees in the Haitian Peasant Economy**

In light of the dire consequences related to tree removal, some have asked why rural Haitian farmers continue to cut trees on their lands. To adequately address this question, one must understand the role that trees play in the Haitian peasant economy.

Traditional tree-use by rural Haitian farmers is diverse. Trees are used to delineate property borders, to construct living fences, to provide fruit, for animal forage, for construction, for medicine, for religious and spiritual purposes, for tool and furniture making, for shade for animals, for shade for coffee, and to provide firewood (Mintz 1962; Smucker 1981; Balzano 1986; White 1994). Additionally, trees are sometimes not cut, for perceived environmental services such as soil erosion prevention and moisture retention (Conway 1986). All of these trees uses continue today. Here I limit my examination to those tree products that Haitian farmers have oriented toward markets: (1) fruit; (2) charcoal; and (3) planks and poles. This approach is taken primarily because Pwojè Pyebwa posited the marketability of tree products as the primary tree-planting motivator. This is not to say that other tree products don’t make their way into markets—they do. The tree products chosen for examination here simply reflect their predominance in internal Haitian peasant markets.

**Fruit**

The continued procurement of fruit requires that fruit trees not be cut. Most fruit trees used by Haitian peasants are found within the *lakou* (multi-household compound) or within the nearby *jaden* (established gardens, often adjoining the lakou) (Smucker
To the Haitian farmer, fruit plays an important role in offsetting agricultural losses from drought years or years experiencing low crop yields (Smucker 1981).

Most fruit in Haiti is consumed locally, regionally, or nationally—at home, in local markets, regional markets, or in Port-au-Prince. Because many species of fruit trees bear fruit all at once (Murray 1989:7), fruit does not fetch a high market price—why buy your neighbor’s mangoes when your mango tree is giving abundantly? This is the classic economic problem of supply and demand. Difficulties also arise in directing fruit toward internal and external markets because of issues related to transport, storage (shelf life), and quality control (Smucker 2005; Smucker 2007). Nevertheless, some external marketing occurs, though usually at higher levels of agricultural production or within the confines of well-networked and highly-organized cooperative arrangements. Generally, Haitians are very reluctant to cut fruit trees, but will do so if they are deemed post-productive (Balzano 1986). The extent to which fruit factors into livelihood strategies varies considerably from area to area, but can be said to be high for most of rural Haiti.

**Charcoal**

Estimates of the national energy need met by charcoal or firewood in Haiti range from 66-85% (Howard 1998:18; Van der Plas 2007:3). Interestingly, charcoal-making was not a traditional activity of the rural Haitian peasantry. For cooking, firewood was collected or branches cut for cooking on a *twa wòch dife* (three rock fire) pictured in Figure 3-1 (Van der Plas 2007:16, 35). Charcoal production in the current rural Haitian economy is a development that is paralleled and largely driven by urban charcoal demand (Van der Plas 2007). That is, enterprising Haitian farmers turned to charcoal-
production largely as a means to acquire money, as the internal charcoal market slowly developed in tandem with the trend toward urban migration. It is estimated that over 80% of charcoal produced in Haiti is consumed in the capital of Port-au-Prince (Van der Plas 2007:21).

Just as rural Haiti is not homogenous, neither are the conditions favorable to benefiting from the charcoal trade. Availability of trees, species of trees, climate variations, seasonal demand, location, accessibility and many other factors play an important role in measuring the risks and advantages a rural farmer might take in entering the charcoal market (Smucker 1981). Thus, some households produce charcoal as a primary livelihood strategy, while others engage in charcoal production as a supplementary income-producing strategy (Smucker 1981; Smucker J. 1981; Van der Plas 2007:19).

Women and men engage in different aspects of charcoal production. Far from an easy task, “the peasant charcoal industry is a labor intensive proposition” (Smucker 1981:20). Generally speaking, men are more involved in cutting trees, cutting wood into small pieces and transportation, and women are more involved in the actual production and marketing aspects of charcoal (Smucker J. 1981).

The considerations just highlighted play a major role in determining the extent to which a farmer may benefit from charcoal production. The direct benefits of charcoal production (income) generally take precedent over long-term, indirect costs (loss of valuable topsoil; loss of environmental services). It is hard to make generalized claims about the charcoal market for all of Haiti, given the heterogeneity of circumstances.
Nevertheless, charcoal—like fruit, factors substantially into many Haitian farmers’ livelihood strategies. The extent to which a farmer profits from charcoal is variable.

**Planks and Poles**

In addition to the charcoal market—albeit to a lesser extent—poles and *planch* (planks) play an important role in Haitian peasant tree uses. Murray explains that the Haitian Creole term “planch generally refers to the wide, thin board” (Murray 1979:162). Poles are generally used in construction and planks are generally used for furniture. Poles are often procured from trees that have already been cut and are coppicing. Interestingly, planks fetch a substantially higher amount of money in the internal market than charcoal made from the same type of wood (Conway 1986). Planks are generally sawed by hand in a labor intensive process:

In Fond-des-Blancs, as well as in other rural locations of Haiti, lumber is sawed by hand. In this process, workers build a huge platform large enough to hold the log and allow a person to stand on top of the log and another at the bottom. The worker’s partner stands below the platform to pull the other end of the saw. This is a very slow and painstaking process, and producing just a few pieces of lumber takes many days hard work. (Thomas and Fendall 2003:107)

However, only certain trees *ka fè planch* (can make planks) and because the work of sawing can take several days, the financial attractiveness of the endeavor may be limited. Nevertheless, Haitians will certainly make planks over charcoal if the overall price is right:

[F]armers tended to hold mature trees as a store of value, and harvested trees when they needed cash. They preferred to hold out for high value wood products particularly plankwood and polewood. (Smucker 2005:4)
Thus, planks and poles constitute an important part of Haitian farmer market-oriented tree products, and by extension an important component of overall livelihood strategies. Further research on the plank or charcoal decision-making process is needed.

**Summary**

In this section I have provided the briefest overview of information related to the top three Haitian farmer tree uses. Fruit provides much in the way of food and forage for animals, and occasionally provides income in the internal markets. However charcoal, poles, and planks have a particularly important place in the income procuring livelihood strategy of the rural Haitian peasant. Related to these latter uses, trees act as a kind of reserve—a rural bank—to be harvested “as a source of cash for emergencies” (White 1994:16). That is, in an unexpected event such as a wedding, funeral, or hospital visit, a Haitian may cut a tree to provide the necessary income to pay for the event.

Having a grasp on these important tree uses—particularly market-oriented tree uses—is crucial to understanding the measures recommended by Murray in the design of Pwojè Pyebwa. Equally important is an understanding of why many previous tree-planting projects in Haiti failed.

**A Brief History of Tree-planting Projects in Haiti**

Various policies aimed at slowing or stopping tree-cutting, from the colonial period to the 20th century, enjoyed very minor successes in Haiti (Lindskog 1998; Moya Pons 2007). However, it is widely held that reforestation projects in Haiti have met with little to no success (Murray 1979; White 1994). In the sections that follow I examine these early tree-planting projects and the reasons they failed. I end by highlighting a particular success story—Pwojè Pyebwa.
Early Tree-planting Projects

The first found instance of a bilateral entity’s position on Haiti’s ecological issues occurred in the first half of the 20th century. “Ecological protection had officially been recognized as a problem in Haiti since the first United Nations mission in the late ‘40s” (Murray 1989:1). The first rural development project of the United Nations (UN) in Haiti, which included soil conservation and forestry activities, was in the Marbial Valley in the late 1940s (White 1994:26; Schuller 2007).

Literature detailing specifics on the UN project and subsequent related projects was difficult to come by—although a summary report of findings from this period is available (Murray 1979). Perhaps development-oriented organizations were not eager to sound their trumpets of failure. Perhaps the reports have simply been lost. One researcher reports that his “chronological survey of Haiti’s early experience with reforestation shows a variety of interpretations and no consensus other than deforestation and soil erosion continue to be a serious problem” (Catanese 1999:36). Murray provides perhaps the most succinct explanation of the phenomenon of failed tree projects during this period:

[F]or decades numerous development organizations have tried to take at least some concrete steps toward reforesting one or another region. There is now a substantial list of local trees planting efforts undertaken during the past four decades. At different times in recent history, international or bilateral development projects such as FAO, UNESCO, BID, USAID and CIDA have financed development projects which have attempted to plant trees in one or another part of Haiti. There is a lengthy list of smaller Private Voluntary Organizations who have financed and/or managed smaller local tree planting efforts. (Murray 1983:2)

While the wide-scale failure of previous projects is hardly a contentious subject, skeptics noting the lack of literature presented here can alleviate their doubts simply by visiting rural Haiti or by examining Murray’s report on these projects (Murray 1979).
Reasons for Previous Project Failures

Why have most reforestation and soil conservation projects in Haiti failed?

Anthropologist Gerald Murray had been investigating issues related to peasants, land tenure, soil erosion, and tree planting in Haiti for several years (Murray 1977; Murray 1978; Murray 1978b) when he was commissioned by the United States Agency of International Development (USAID) to answer this very question. Using anthropological methods of inquiry, Murray examined 19 previous or currently operating conservation projects in five different regions of Haiti (Murray 1979). In a published report to USAID, Murray reported general observations, technical considerations, institutional considerations, operational recommendations, and project design recommendations based on his research (1979:2-25). In sum, he highlighted specific factors contributing to the long history of project failures, and furbished a series of recommendations for future projects. Some of Murray’s key insights into why previous projects failed include:

1. Terracing and wall-building to prevent erosion is unlikely to succeed on a large scale because the work-to-payoff ratio is not high in the eyes of Haitian farmers.

2. Farmers are not likely to participate in restoration projects unless there is a financial incentive to do so.

3. Some previous efforts focused on planting indigenous trees—many of which grow slowly—thereby negatively offsetting any financial attractiveness of the endeavor to Haitian farmers. The planting of fast-growing tree species would be a better strategy to slow soil erosion while simultaneously providing farmers with the economic incentive to participate.

4. Some projects advocated a resettlement of peasants—a strategy of ethical questionability and likely to be heavily resisted by farmers.

5. Previous projects had stressed “reforestation,” leaving little room for crop-growing or other livelihood activities important to the Haitian farmer. “Agroforestry” is a better approach because it allows for the continuation of other activities such as growing crops or tending of animals.
This brief list highlights some of Murray’s key discoveries as to why previous soil conservation and tree-planting projects in Haiti had largely failed. The reader interested in a comprehensive listing—including recommendations for future projects—is encouraged to consult the report (Murray 1979) and later summations of the project (Murray and Bannister 2004). While other site-specific conditions should play an important role in specific project implementations, in this report Murray provided a clear over-arching picture of why previous projects had failed. It would be 2 years later that his recommendations from this report would be used in the policy development of Pwojè Pyebwa.

**Pwojè Pyebwa – The Agroforestry Outreach Project and Agroforestry 2**

Pwojè Pyebwa was an agroforestry tree-planting project based on anthropological tenets, funded by the United States Agency for International Development (USAID), implemented primarily by the Pan American Development Organization (PADF) and CARE, and carried out through numerous nongovernmental organizations (Murray and Bannister 2004). It was the largest tree-planting project in Haiti’s history. Spanning a decade\(^5\)—from 1981 to 1991—the project operated under two different names. Originally called the ‘Agroforestry Outreach Project’ (AOP), operations were renamed ‘Agroforestry 2’ in the late 1980s (Campbell 1994). In this thesis, project operations during the entire decade have been collectively referred to by the Haitian Creole name *Pwojè Pyebwa* (The Tree Project).

\(^5\) Tenets from Pwojè Pyebwa continued to inform PADF project policies through a second decade—from 1992 to 2000—but are not examined here because these latter projects deviated from a strictly tree-planting approach (Murray and Bannister 2004:391).
Shortly before the project commenced, USAID contracted another anthropologist with experience in Haiti to conduct a feasibility report on the insights and suggestions put forward by Murray (Smucker 1981; Campbell 1994:26-27). Many of these insights—provided by Murray and evaluated by Smucker—were incorporated into policy when USAID decided to commence Pwojè Pyebwa in 1981:

The approach was based on several factors, including (1) the adaptation of the project to pre-existing Haitian land tenure, tree tenure, and market systems, (2) the elevation of micro-economic over macro-ecological themes, (3) the decision to bypass the Haitian government and operate the project through local NGOs (non-governmental organizations), (4) the use of a joint-venture mode in which smallholders supplied land and labor and the project supplied capital in the form of seedlings, (5) the use of professionally managed small-container seedling technology rather than backyard nurseries, and (6) a project management policy that encouraged farmer-induced deviations from project assumptions in matters of tree deployment and harvesting schedules. (Murray and Bannister 2004:384)

In addition to the points outlined here, a variety of fast-growing species were made more widely available after they proved popular with farmers. Although the dictates of this thesis prevent a detailed explanation of all of these factors, the interested reader is encouraged to consult the recent and succinct project summary provided by Murray and Bannister (2004).

With the anthropologically-informed project architecture in place, the first tree seedlings were delivered to nongovernmental organizations operating throughout rural Haiti. Some ten years later the overall figures from the project were astounding:

It is known that many farmers receiving 200 or 300 seedlings would distribute a substantial but impossible-to-quantify number to relatives or friends, who thus became de-facto – but uncounted – project beneficiaries. A conservative estimate of numbers of distinct households planting the 48 million seedlings distributed during the first decade would be 190,000 households, or about 250 seedlings per household. (Murray and Bannister 2004:391)
To put these figures in perspective, if 48 million seedlings were distributed in Haiti today, every Haitian in the country would receive approximately five trees.

An evaluation based primarily on seedlings distributed or on numbers served would deem the project highly successful. Similar proclamations have been made using the rubric of tree demand. As one anthropologist involved in the project stated, “It is clear from the overwhelming demand for trees that the Project can already be counted as a success” (Smucker 1986:228). A similar outcome surfaces when success is measured against the fulfillment of the project’s two primary objectives: (1) to motivate Haitians farmers to plant and maintain trees for the primary purpose of income-generation; and (2) to achieve the first objective in large numbers with secondary goals of soil conservation and improvement, provision of fuel-wood, and the provision of other environmental services (Murray and Bannister 2004). Two years into project operations, Pwojè Pyebwa won the prestigious international Anthropology Praxis Award in applied anthropology. In spite of these indicators of success, several criticisms of the project have surfaced.

**Critiques of Pwojè Pyebwa**

The literature review revealed several criticisms of Pwojè Pyebwa (Escobar 1991; Campbell 1994; Catanese 1999). Some of these criticisms deserve attention, while others are apparently the result of a limited review of publications available on the project. I will briefly treat those criticisms worth highlighting.
In common, two critics noted the tendency to evaluate project success based on numbers served—either in seedlings distributed or in households participating\(^6\) (Escobar 1991; Campbell 1994). “[O]ne is given little information as to what else changed in the process, materially and culturally. In other words, the reader is supposed to accept the study at face value given the amount of trees planted or income generated, but she or he is not presented with a broader context in which to assess the real impact of the project” (Escobar 1991:674). Murray and Bannister acknowledge and address this concern when they note that “success must be evaluated on criteria that go beyond crude number crunching. We consider the qualitative descriptions of emergent agroforestry systems presented in the preceding section to be better indicators of the effectiveness of the approach” (2004:392). These qualitative descriptions are nevertheless offered at a high rung of project implementation. Less common are site-specific qualitative descriptions—a major goal of my research.

Catanese appears to conflate the project’s agroforestry approach with goals of reforestation, when he concludes of Pwojè Pyebwa that “it is extremely unlikely that efforts aimed at encouraging farmers to plant trees will have any meaningful impact on slowing the trend in deforestation, let alone reversing it” (Catanese 1999:41). While protection of remaining forests or forest regeneration may have been a desired or hypothesized side-effect of Pwojè Pyebwa, it was never explicitly listed as a project objective. Murray made it very clear that previous approaches aimed at reforestation had largely failed (Murray 1979). The primary project objective was to provide

\(^6\) The research presented in this thesis attempts to further address this criticism by providing a qualitative, site-specific outcome-evaluation.
environmental services (such as soil conservation) while simultaneously providing farmers with a source of income through the planting of fast-growing trees.

Escobar, well known for his critiques of development, attacked the project on several fronts in a prominent anthropological journal (Escobar 1991). However, it appears that he read only one account of the project. Were he to have considered the other literature on the project, I suspect he would retract many of his criticisms. Most importantly, Escobar’s critique demonstrates a misconception of the distinct nature of the peasant system as it uniquely developed in Haiti. Murray and Bannister have addressed this last point elsewhere (Murray and Bannister 2004).

One major criticism of Escobar’s was that Pwojè Pyebwa was “for the most part, run by external PVOs [private volunteer organizations]. Haitians had to fit into a preexisting structure in order to participate in it” (Escobar 1991:672, brackets mine). This claim is, quite simply, wrong. A report of the first five years of the project, written by a respected anthropologist, clearly explains that “three-fourths of all subprojects are local organizations rather than international agencies” (Smucker 1988:8).

Undoubtedly unintentional, Escobar numerically misrepresents the article, saying “about 75 million trees were planted in four years” (Escobar 1991:673). Not only does this incorrect number exceed the full decade of Pwojè Pyebwa estimates by over 25 million trees, it also exceeds cumulative USAID-funded tree-planting estimates from two decades (1981-2002) (Murray and Bannister 2004). The correct numbers are clearly listed in the article Escobar attacks:

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7 Glenn Smucker was the invited keynote speaker at the Haitian Studies Association in 2009.
By the end of the fourth year, the project had planted, not its originally agreed-upon three million trees, but twenty million trees. Stated more accurately some 75,000 Haitian peasants had enthusiastically planted trees on their own land. (Murray 1987:221)

This grave numerical error on the part of Escobar, misguided notions about the project implementation, and his misunderstanding about Haitian peasant market systems call into question the other claims made in his article. Thus, Escobar fails to provide a convincing critique of Pwojè Pyebwa, which he notes is “hailed by many as an exemplary case of the anthropologist’s involvement in development” (Escobar 1991:671).

Another interesting criticism of the project is brought up by Campbell, who worked on Pwojè Pyebwa for some years in the northern part of Haiti:

A surplus of fruit in relation to local consumption or possibly of wider marketing is noted [by Murray] and taken as evidence that project-promoted planting of additional fruit trees is not called for. Murray thus indirectly compliments the peasant farmers on their ability to grow, without project assistance, even more fruit trees than they need. Yet, he does not ask, nor offer any answer to, the question of why, if it is such a good idea for them to grow more “wood” trees, they are not already doing so. (Campbell 1994:23)

To succinctly paraphrase the claims of Campbell, Murray and others have noted that Haitians are ingenious and resourceful cash-croppers. Furthermore, it has been established that Haitians know how to plant trees. Why then, were they not already planting wood trees if it is economically advantageous to do so? Here, it appears that Campbell did not read the anthropological explanations by both Murray and Smucker, which explain why Haitian peasants traditionally do not grow wood trees in large numbers (Murray 1981; Smucker 1981; Murray and Bannister 2004). These authors have noted that Haitian farmers will protect and nurture volunteer wood trees, but rarely
plant them. Nevertheless, Campbell seems to provide some anecdotal evidence for wood tree planting. Further research into Campbell’s claims is needed.

In summary, Pwojè Pyebwa has experienced some minor criticisms. Some of these criticisms can be chalked up to poorly conducted research, narrow literature reviews, or little understanding of conditions unique to Haiti. The question raised by Campbell is interesting, but has little relevancy to this thesis, due to its post facto nature. Furthermore, the enthusiasm for seedlings expressed by most farmers (Smucker 1986; Murray and Bannister 2004) seems to counteract Campbell’s implication that the trees were pushed on farmers (Campbell 1994). Finally, the claim of project success being measured by “numbers served” deserves attention. My research, conducted in Fondeblan, addresses this criticism.

**Fondeblan (Fond-des-blancs)**

Preceding the data collected for this thesis are the findings of an anthropologist who lived in Fondeblan and published a report as well as a dissertation on the early years of Pwojè Pyebwa operations (Balzano 1986; Balzano 1989). The same anthropologist returned approximately 10 years later and wrote a qualitative assessment of changes to the area. In this section of the literature review, these reports are supplemented by the published memoirs of the area’s chief Pwojè Pyebwa implementer, newsletters from the project’s implementing NGO, and the occasional brief mentioning of the area in other reports.

The sum result is the availability of a rich store of longitudinal data, reports and assessments related to Pwojè Pyebwa, spanned over the time period of approximately 30 years since the project’s commencement (Balzano 1986; Balzano 1989; Smucker and Timyan 1995; Balzano 1997; Clavissaint 1998; Thomas and Fendall 2003; Smucker
2007). Here I review the literature available prior to my research, to paint a picture of Fondeblan that will ground and contextualize the findings presented in my thesis.

**Geography and Demographics**

Fondeblan is located in the *Depatman Sid* (southern department), *Komin Aken* (Aken County). There is no visible line demarcating where Fondeblan begins and ends, but there are some generally accepted ideas of the area’s boundaries. One source delineates Fondeblan as “a rural area about twenty miles in diameter and made up of a number of small communities” (Thomas and Fendall 2003:47). Another source simply states that Fondeblan is a rural area with approximately sixty different neighborhoods (Balzano 1986). A key informant told me that *Komin Aken* is composed of 12 different sections, four of which are referred to as Fondeblan. Balzano suggests that this latter parameter was an idea promoted by nonprofit organizations working in the area (Balzano 2010, personal communication). According to Balzano, the Komin Aken is composed of four sections, and the *seksyon kominal nevyèm* (ninth section) is what he refers to as Fondeblan.

I was unable to access census data that would give demographic details on the population of Fondeblan. A recent article in the New York Times about the post-earthquake urban-to-rural migration trend reported that “community leaders [in Fondeblan] say the population, counted at 45,000 by a government census in 2001, has swelled by at least a third since the quake” (Sontang 2010:2).

Geographically, Fondeblan is “located 20 km south of the national highway half way between Port-au-Prince and Les Cayes” (Smucker et al. 2007:37). Thus, Fondeblan is situated approximately in the middle of Haiti’s southern peninsula, 10
miles north of the southern coast. Its geographical coordinates, according widely used satellite imagery software, are 18° 17' 0" North, 73° 8' 0" West. Geographically, Fondeblan, like much of rural Haiti, consists of rolling hills cut by deep and wide valleys. The major valley in the area was reported to be “bounded on the north and southwest by steep slopes (peaking at 380-400 meters) and is interrupted to the southeast, first by a singular mountain and then by the Moussignac-Côte de Fer road” (Balzano 1986:6).

History of Fondeblan

A readily available and reliable history of Fondeblan was not available to me at the time I conducted this research. Nor was such a history attainable given the goals of my research and the limited time in the area. Similarly, most of the residents I communicated with were unable to provide concrete details, save speculations on Polish influences in the area. These speculations are well captured by Thomas and Fendall:

The oral history suggests that when Napoleon’s army invaded Haiti to restore slavery, a Polish contingent defected and joined the Haitians’ cause. They were among the few whites allowed to remain in Haiti after it won independence. A group of them settled in the Fond-des-Blancs area, which still has a large number of light-skinned, green-eyed, straight-haired residents. (Thomas and Fendall 2003:47)

Various versions of this story were relayed to me in both Bèl Rivyè (a neighboring town) and Fondeblan, when I asked residents about the history of the area. It is reported that approximately 5,500 Polish soldiers were sent under Napoleon’s flag to Haiti during the period between 1802 to 1803 (Rypson 2007:31).

Folk Etymological Origins of the Name Fondeblan/Fond-des-Blancs

The French-derived name “Fond-des-Blancs,” is reported to mean “place of the whites” (Thomas and Fendall 2003:46). In Haitian Creole, “fon” can mean “deep” or
“bottom” (Valdman 2007:247-248). The similarly sounding word “fwon” is sometimes pronounced “fon,” and can mean “coalition,” “funds,” or “forehead” (Valdman 2007:247-248). “The coalition of foreigners” or “coalition of whites” translation that the word “fwon” would offer is interesting, considering the local oral history of a defection of Polish soldiers that fought on the side of Haitians.

The author of a dissertation on Polish influences in Haiti speculated similarly on the origins of the names “Fond Blanc” and “Fond-des-blancs” (Fondeblan). Residents of both of these similarly named but distinct locations claim different reasons for the origin of their townships names. While residents of Fondeblan widely contribute the name of the area to the influence of Polish settlements, such is not necessarily the case in Fond Blanc:

When I asked several informants in Fond Blanc and Cazale as to the origin of the name Fond Blanc, without exception they answered that it reflected the lighter soil that was to be found in the area. ‘Fond’ means ‘hollow’, ‘down’, or ‘deep down’ (much the same as the French word), and ‘Blanc’ is the French and the Kreyol [sic] word for ‘white’. Yet in Kreyol, ‘Blan’ also means foreigner, so it might also have been a reference to the white settlers that settled there. Importantly, Fond Blanc is the first location where the Polish Legionnaires decided (or were granted permission by Dessalines) to settle. This is testified to by both the inhabitants of Cazale as of Fond Blanc. It is therefore impossible at this point to totally reject the idea that the ‘Blanc’ in the ‘Fond’ has nothing to do with the ‘blans’ who settled this remote village. (Rypson 2007:74)

Rypson goes on to indicate similar phenotypic features between residents of Fond Blanc and Fondeblan, further asking whether “it can be pure coincidence that two widely accepted locations of Polish settlement share such similar names; moreover, names in which the word ‘Blanc’ is the most important signifier” (Rypson 2007:74). Thus, while the name Fondeblan could have emerged from a variety of different contexts, given the oral history about Polish settlements, the presence of unusual phenotypic features, and
the similar name with another area settled by Polish people, it is possible that the
Thomas and Fendall account is true.

Balzano reports having seen historical documents which place French migrants in
Fondeblan at least a generation before the Haitian revolution (Balzano 2010, personal
communication). He added that deeds documenting land grants in Fondeblan from the
1806 to 1816 have only yielded French family names. According to Balzano, there was
no known memory of Polish origins in Fondeblan until the visit of the pope, in 1983.

Ecology

The ecological data on Fondeblan is of the broadest nature. In one account, it was
noted that the area didn’t look much different than many other places in rural Haiti. It
displayed the “effects of decades of deforestation, namely the loss of top soil to erosion
in the hills and mountains” (Thomas and Fendall 2003:48). A second account confirms
this, stating that “three hundred years of agricultural production . . . have subjected the
vulnerable hillsides [of Fondeblan] to extensive sheet erosion. Such erosion has
stripped away its limestone based top soil and deposited it in the plenn [plain]” (Balzano
1986:6).

Balzano reported that the area has no major permanent surface water and that
“rainfall averages 600-800 millimeters per year” (Balzano 1986:7). Furthermore,
according to residents, the area receives no rain from May to July and from November
to January (Balzano 1986). Details on the soil conditions, while not elaborate from an
ecological point of view, have been reported:

   the people here have developed a “black-red-white-rock” soil classification
   system that corresponds quite accurately to their lime-stone and basalt
   bases, the presence of alluvial deposits, and the occurrence of sheet and
gully erosion. (Balzano 1986:6)
Balzano attributes wide-scale erosion in the area principally to agricultural activities (Balzano 1986). These activities, combined with two rainy seasons, have resulted in the soils currently found in Fondeblan.

One interesting feature of Fondeblan that differentiates it from much of the rest of rural Haiti is the existence of *rak bwa* (plots of tree-covered land). Balzano reports that many of these *rak bwa* are vestiges of original forest, while some of them appeared to be managed to some degree (Balzano 1986). Some of these *rak bwa* existed before the implementation of Pwojè Pyebwa.

In returning to Fondeblan some 10 years after the research conducted for his PhD, Balzano noted that the hills in the area did not appear any more or less forested than before (Balzano 1997:21). Having just returned from a recent trip, Balzano confirms the same observation, from the same location where he stood in 1997 (Balzano 2010, personal communication). However, he reached consensus with a local agronomist that the valley had about 25% to 30% canopy cover provided by Pwojè Pyebwa trees. In his first return visit Balzano noted many project trees that were allowed to grow to heights of up to 60 feet (1997:21). As most Pwojè Pyebwa trees were planted within the *lakou* (compound) or nearby *jaden* (cultivated gardens), it makes sense that the hills themselves would not appear particularly more heavily treed. However, a six-fold increase in the number of charcoal trucks leaving the area daily begs the question of where the wood for the charcoal came from (Balzano 1986; Smucker et al. 2007). It is presumable that a substantial percentage of the wood used to meet this increase came from Pwojè Pyebwa trees.
Ten years after Balzano’s most recent trip to the area, another document reported that “a recent site visit shows evidence of a “radical” change in the landscape since 1982 with trees of project derivation now covering a large percent of the land” (Smucker et al. 2007:37). Smucker believes that there may have been a shift toward including project trees within rak bwa (Smucker 2009, personal communication). Balzano made an initial distinction between woodlands and hardwood lots. According to his distinction:

hardwood woodlots appear to be vestiges of natural forests (i.e., they were not deliberately planted but are actively managed). This is evident in the vegetative structure of the woodlot. Trees of varying maturity and size form a canopy for a shrubby and herbaceous undergrowth. These woodlots have not supported agricultural activity in living memory. . . . No one species appears to be dominant in these woodlots. . . . Nearly every species present is considered to be a source of good hardwood sawtimber. They also provide a variety of wood products (e.g., wood for charcoal, wood for agricultural tools) and shade for tethered livestock. (Balzano 1986:17)

Conversely, the woodlands, according to Balzano, are “dominated by one of three species: either bayahond (Prosopis juliflora) [sic] or kanpèch (Haematoxylum campechianum) or dilen (Leucaena glauca) (Balzano 1986:17). It is in this latter category of “woodland” that I would suspect project trees would have been added to—beyond the yard or lakou, as Smucker suggests. However, I did not observe this practice and neither has Balzano (Balzano 2010, personal communication).

While Balzano initially made this important distinction, he goes on to lump the two together under the term “rak” or “rak bwa” for the remainder of his research, because the local Haitians “refer to them both by the same terms...” (Balzano 1986:17). Balzano claims the distinction still holds true (Balzano 2010, personal communication). The existence of rak bwa in the area prior to the project is important, and research into their species content and history is important.
Culture and Society

Fondeblan appears to have a level of societal stratification more diverse than other parts of rural Haiti. The earliest reports from the area (~1980) indicate the presence of wealthy rural elite:

A few wealthy families monopolized the business in Fond-des-Blancs. Most of them were connected with the militia of the Duvalier regime. They owned the means of transportation, controlled the sale of processed goods, and made informal loans to those willing to pay their 100 percent interest rate. (Thomas and Fendall 2003:47)

This arrangement is not inconsistent with the era, and could be found in other places throughout rural Haiti. Balzano, while acknowledging the presence of these wealthy families, also noted a secondary social level. This second level of well-off peasantry is seemingly at odds with the traditional elite-peasant dichotomy that has traditionally dominated much of the Haitian countryside:

A few residents . . . are bona fide members of the urban middle class. They own and/or rent property and businesses in Port-au-Prince . . . More common though . . . is the well-off peasant with extensive landholdings but still poor by urban middle-class standards. This well-off peasantry forms a distinct rural elite class, though no family or person in that class holds economic or political sway over it. [E]lite often have immediate kin who are members of the urban middle and working classes. They send their children to the United States, Canada, or France. Thus, any characterization of the people . . . would not be complete without mention of their strong urban ties. (Balzano 1986:9)

The extent to which the success of Pwojè Pyebwa was related to the elite in Fondeblan is a topic of significance in Balzano's PhD dissertation (Balzano 1989; Balzano, personal communication 2010).

Like much of rural Haiti, land ownership is high in Fondeblan. Earlier nation-level census data from the southern portion of the country indicated an 85% land ownership rate (Zuvekas 1978:77). This high regional level of individual land ownership
demonstrates the continued legacy of the post-colonial land redistribution policies enacted by Petion, and continued later by Boyer in the north (Moya Pons 2007). In Fondeblan, individual land ownership was reported at a similar rate, with 20% of the population described as large-scale land owners, 60% described as small-scale land owners, and 20% as owning no land at all (Balzano 1997:9).

The first survey of religion in Fondeblan found that Catholics represented 85 percent of tree-planters in the project, with a respective 85-25 percent distribution of Catholics and Protestants in the general population (Balzano 1986:13). A decade later, Balzano noted incredible increases in the Protestant population, attributing them to the work of the local Baptist mission and the election of several Baptists to local government positions (Balzano 1997).

Vodou (voodoo)—the western name for the popular folk religion—is practiced widely throughout rural Haiti. That Haitians are reluctant to publicly affiliate with Vodou is widely known and has produced an oft-quoted and oft-paraphrased adage: eighty-five percent of Haitians are Catholic, but one-hundred percent practice Vodou. A more modest estimate is that between half and three-fourths of the population of rural Haiti practice Vodou (Murray 1985). Whatever the case, it would be difficult to measure the effect of Vodou on tree-planting given reluctance to publicly admit affiliation. Interestingly, Balzano noted an increased openness to talk about the practice of Vodou on his follow-up trip to the area (Balzano 1997).

Development and Infrastructure in Fondeblan

The earliest available account of the infrastructure in Fondeblan indicates the area’s isolation and the lack of access:
Getting to Fond-des-Blancs was not easy, since the roads were so badly neglected that they could barely be called roads at all. Only the toughest vehicles could make it up the steep hills. (Thomas and Fendall 2003:47)

The result of poor road conditions meant that the peasant communities living the area had unreliable access to regional and national markets—access which was favored, and factored substantially into peasant livelihood strategies. These problems were compounded when heavy rains made roads completely impassable. The result was that “those in Fond-des-Blancs who had charcoal, livestock, or produce to sell would not be paid a decent amount for these commodities because of the difficulty of transporting them” (Thomas and Fendall 2003:141).

The seemingly natural solution was the improvement of the main road that ran through Fondeblan and connected to other major artilleries, eventually leading to the capital city of Port-au-Prince. Major road projects commenced under CODEF, the development arm of the local Baptist mission:

Between 1994 and 1996, CODEF improved over two hundred miles of road around Fond-des-Blancs and a major connection between the National Road – Cote-de-Fer and Benait. More than 10,000 people found temporary employment. The traffic between Fond-des-Blancs and the national road drastically improved. (Clavissaint 1998:1)

Balzano confirms this recent improvement to roads during his 1997 visit (Balzano 1997).

A trend away from agricultural activities appears to be taking place in Fondeblan. In the first report of the anthropologist living in the area, he noted that very few opportunities for finding work outside the realm of agriculture. His research reported that “there are three masons, two carpenters, two gangan (traditional priests), two school teachers, and a health aide” (Balzano 1986:8).

While the major road improvements occurred from 1994 to 1996 (Clavissaint 1998; Thomas and Fendall 2003), the trend that Balzano reports appears to start prior
to, and independent of, road improvements. “In the ten year period from 1986 to 1996 Fonds-des-Blancs has experienced a construction boon and a shift in economic activity from agriculture to commerce” (Balzano 1997:8). It is possible that the primary road improvements occurred first, allowing substantial changes in the two years between the road project’s commencement (1994) and Balzano’s second visit (1996). It is also possible that urban demand for rural resources during the U.S. imposed embargo necessitated these changes the area, regardless of road conditions. An influx in the availability of vehicles able to traverse these roads may also have played a factor.

Many of the changes that have taken place in Fondeblan can rightly be said to be ushered in through the work of several influential non-governmental organizations working in the area, including the catholic hospital, the associated peasant cooperative, and the protestant mission that oversaw Pwojè Pyebwa in Fondeblan.

**Pwojè Pyebwa in Fondeblan**

Fondeblan has a unique history in relation to Pwojè Pyebwa. Namely, it was the first location in Haiti that project seedlings were delivered to, in the spring of 1982 (Smucker et al. 2007:37). After several seasons, operations were handed over exclusively to the *Cooperation de Developpement et Planification* (CodePla), a development organization of the Council of Evangelical Churches of Haiti. Several years later, CodePla tree-planting operations transitioned over to the *Cooperative de Developpement de Fond-des-blancs* (CODEF). It should be mentioned that CODEF is a cooperative, and the development arm of the Haitian Christian Development Fund (HCDF)—a faith-based evangelical nonprofit organization run by a charismatic Haitian pastor. Regardless of the somewhat confusing shifting of names and administrators, the
project remained essentially the same, and CODEF served as the primary project implementer for most of the decade. The operations of CODEF were not limited strictly to Pwojè Pyebwa. As already noted, they were involved in road building in the area. Additionally, the cooperative continues to sponsor “a pig redistribution program, a goat stock improvement program, and is constructing a water system...” (Balzano 1986:9).

The cooperative deviated from many of the other Pwojè Pyebwa NGOs that received seedlings from external nurseries; CODEF constructed its own on-site nursery (Thomas and Fendall 2003:103; Smucker et al. 2007:37). A comprehensive report on the first five years of Pwojè Pyebwa operations indicates that 33 of the 182 NGOs participating at that time had their own nurseries (Smucker 1988). Figure 3-3 displays three photographs of CODEF’s nursery in the early years of the project. This nursery had the capacity to produce approximately 250,000 seedlings per year (Smucker et al. 2007:37). CODEF estimates that approximately two-million trees were distributed to farmers in Fondeblan during this decade (Clavissaint 1998). An application of the cooperative’s cautious survival rate of 35% (Thomas and Fendall 2003) suggests that at least 700,000 project trees successfully took root in the hills of Fondeblan.

To what extent has this tree planting continued? The primary administrator of the cooperative reported that CODEF no longer plants trees (Clavissaint 1998). Ten years later, Smucker offers a seemingly different account:

CODEF has 3,000 local farmer members, most of whom have tree gardens of 250 to 500 trees. Cooperative members commit to planting 10 new trees for each mature tree that is harvested. (Smucker et al. 2007:37)

Perhaps Clavissaint meant that CODEF no longer distributes free seedlings. It is possible that farmers are now purchasing their own seedlings or protecting volunteers from project trees, as other aspects related to the project continue. For example,
Clavissaint mentions CODEF’s has its sights on “a sawmill and charcoal making project that would harvest the current stock of trees and encourage the participating farmers to plant new trees to replace the ones being harvested” (Clavissaint 1998:1). Thus, in the same document he mentions that CODEF does not plant trees, but that CODEF wants to encourage farmers to plant trees. This suggests that a behavioral change has occurred in Fondeblan. That is, it was previously believed that Haitian farmers would not plant “wood” trees, for reasons both economic and cultural.

In 2002, with the help of a donor, CODEF received a portable sawmill and began cutting boards (Thomas and Fendall 2003). FIGURE 3-3 displays this saw mill, in addition to early nursery photo. Thomas, head of the nongovernmental organization that runs CODEF, explains the rationale behind the purchase of a saw mill:

[W]e placed strict requirements on whose logs we would purchase and convert into lumber. First, we encouraged the farmers not to harvest all their mature trees at once. In our system, no more than one-third of their trees may be harvested at any one time, and land-owners have to agree to plant ten trees for every one they harvest. With recent drought conditions, the survival rate of newly planted seedlings may be no better than 20 percent, but even then our system of harvesting and planting means that twice as many new trees survived as were harvested. Up to this time, none of our cooperatives had a processing and marketing component. But in our reforestation and harvest system, it is very important that people have a cash income, that they be able to sell their mature trees at a fair price. (Thomas and Fendall 2003:107-108)

One can see a clear understanding of the role of trees in the Haitian peasant economy in this approach. That is, CODEF recognizes the labor required to saw timber, but also recognizes the much larger profits that timber can provide over charcoal. Even without a sawmill, it would still likely be more profitable to let some trees grow longer for timber. Balzano confirms this strategy in the report of his second visit. “Many of the trees planted in Fonds-des-Blancs [sic] as part of the US AID-financed Proje Pyebwa [sic]
(1982-1987) are still standing or being managed for long-term yields” (Balzano 1996:21). That is, prior to the labor saving sawmill, the strategy of leaving trees to grow for later timber harvest was being employed (Smucker and Timyan 1995).

Yet not all Pwojè Pyebwa trees in Fondeblan are being used for timber. When Balzano first visited the area in 1985, he noted that one full truck of charcoal, “approximately 180 thirty kilogram sacks” left the area for Port-au-Prince daily (Balzano 1986:7). More than 25 years later, Smucker reported a six-fold increase in the number of trucks leaving with charcoal:

There are presently six trucks carrying out one thousand 35-lb. sacks of charcoal daily to Port-au-Prince, and this charcoal is mainly from project-related trees. Charcoal sales are now second in importance to local farmer revenues (after animal-raising). (Smucker et al. 2007:37)

Given that Balzano noticed no negative changes to the hillsides of Fondeblan over a ten year period (Balzano 1997:21), and given that Smucker reported “radical” improvements over at least a 25 year period (Smucker et al. 2007:37), I average these findings to safely conclude that the hills of Fondeblan did not experience substantial increases in deforestation since 1981. This observation, added to the noted increase in charcoal trucks leaving the area leads me to concur with Smucker that charcoal needs were at least partially met by Pwojè Pyebwa trees. As Balzano noted as early as 1996, “charcoal continues to be a chief Fonds-des-Blancs [sic] export, and charcoal-making one of the best ways in Fonds-des-Blancs to generate income” (Balzano 1996:21). Thus, a review of the literature available on Fondeblan leads me to cautiously conclude that while further study is needed, it appears as if the primary objective of Pwojè Pyebwa was at least partially achieved, as were other aspects of the project’s secondary objective.
Summary of Literature Review

The purpose of this literature review, conducted with a political ecology approach, was to bring the reader from the far to the near—both historically and spatially. Starting with the colonial era and working forward in time, I highlighted specific historical and political events thought to substantially contribute to the deforestation of Haiti. After a treatment of these contributions, I turned to examine nation-wide human and ecological vulnerabilities that are linked to Haiti’s wide-scale deforestation. After I examined the role of trees in Haitian peasant economy, I looked at previous tree-planting projects and the explored the reasons their failures. Pwojè Pyebwa was briefly treated, as were some of its criticisms in the social and natural science literature. Finally, the site of the research presented in this thesis was examined. In addition to providing specific details about Fondeblan, an effort was made to examine changes to the area over a 30 year period. This period of time was not arbitrarily chosen, but is a reflection of available literature on the area, which commence around the time that Pwojè Pyebwa started. Taken as a whole, this literature review contextualizes Fondeblan as a specific place in time, and helps to make the findings presented in subsequent chapters of this thesis meaningful and instructive.
Figure 3-1. A traditional *twa wòch dife* (three rock fire).
Figure 3-2. Photos of Pwojè Pyebwa nursery operations in Fondeblan, and a saw mill that came years later.
CHAPTER 4
METHODS

Introduction

The data presented and analyzed in this thesis were collected over a two month period spent in rural Haiti, during the summer of 2009. The first two weeks were spent in Bèl Rivyè (Belle Rivière), a village neighboring Fondeblan (Fond-des-blancs). These two weeks were spent as a member of a linguistics team from the University of Florida, headed by Dr. Benjamin Hebblethwaite. The team consisted of an undergraduate student, two graduate students, and an assistant professor. Team time was spent administering the goals of Dr. Hebblethwaite’s Haitian Creole Scrabble Literacy Project.

I spent the remaining six weeks of research time in Fondeblan. Following an ambitious interview schedule, I collected quantitative and qualitative data through semi-structured interviews with farmers and several key informants. I outline the methodology informing data collection and the specific methods employed in the following sections of this chapter.

Methodology

The methodology informing the data I collected is in line with the literature reviewed in Chapter 3 and the theory presented in Chapter 2—it is based primarily on a materialist approach. Thus, quantitative data were collected through interviews with farmers on a variety of variables thought to reflect concrete ecological conditions, as well as sociocultural and economic realities. Qualitative statements were also gathered
during these interviews to assess farmer attitudes and behaviors\(^8\) in relation to land uses and to livelihood strategies.

**Language Preparation**

I came to this research with the distinct advantage of having been born and raised in Haiti. Unfortunately, due to my attendance at an English-speaking primary school, I had never fully mastered the local language. Nevertheless, I was familiar with many of the language’s sounds and rhythms, and remembered many words in Haitian Creole. In particular, I was easily able to make the nasalized consonant and vowel sounds that so many non-native speakers have difficulty reproducing. The stage for rapid language acquisition was set.

At the commencement of my studies at the University of Florida, I was fortunate to be awarded Title VI funding from the U.S. Department of Education, in the form of a Foreign Language and Area Studies (FLAS) fellowship to study Haitian Creole. The summer before I began courses at the University of Florida, I committed myself to an aggressive independent summer scholarship schedule. That summer was spent bringing myself up to par with the level of comprehension most people acquire in their first year of language studies. I entered second-year Haitian Creole studies during my first semester at the university, and was teaching introductory Creole by the second semester. By the time I left for Haiti to conduct this research, I was functionally proficient and able to conduct with ease the interview schedule I had designed.

\(^8\) I consider Haitian farmers as local ecological experts, intimately involved with their land. They have developed their own systems of identifying processes, conditions, and constraints related to land use. Furthermore, I consider Haitian farmers to be socioeconomically pragmatic in their approach to diversifying and maximizing their livelihood strategies.
Selection of the Research Site

Several factors led to the choice of Fondeblan as a research site. First, it is unique for its status as the very first site that project seedlings were distributed to, in 1982. Second and rather fortuitously, an anthropologist living in the area wrote a report, as well as his PhD dissertation on the early years of Pwojè Pyebwa operations (Balzano 1986; Balzano 1989). Approximately ten years later the same anthropologist returned and gathered qualitative data on changes to the area (Balzano 1997). Such longitudinal data made the site an attractive place to conduct a diachronic study. Third, Dr. Bannister’s friendship with a local pastor—the area’s chief Pwojè Pyebwa administrator—helped to secure room and board arrangements, and had the potential to open doors to key informants. Fourth, the site had been mentioned in the literature as exhibiting “‘radical’ change in the landscape since 1982 with trees of project derivation now covering a large percent of the land” (Smucker 2007). Finally, Fondeblan has a reputable and well established hospital, good road access to Port-au-Prince, a small airplane runway, and was rumored to have an internet cafe. These latter factors made it an especially promising location for continued long-term fieldwork during the later explanatory stages of my research schedule. All factors combined made the case for an excellent fieldwork site.

Formulation of the Research Question

As mentioned in the introductory chapter, the primary goal of this research is to provide a site-specific outcome-evaluation of a previous tree-planting project. Typically, outcome-evaluations are measured against the fulfillment of the primary project objectives, as outlined in the original proposal. Pwojè Pyebwa had two such primary objectives:
1. to motivate Haitians farmers to plant and maintain trees for the primary purpose of income-generation; and

2. to achieve the first objective in large numbers with secondary goals of soil conservation and improvement, provision of fuel-wood, and the provision of other environmental services (Murray and Bannister 2004).

The literature related to the site suggested that farmers in Fondeblan had initially fulfilled both objectives (Balzano 1989; Smucker and Timyan 1995; Balzano 1997; Clavissaint 1998; Thomas and Fendall 2003; Smucker 2007). What remained unclear was whether they continued to meet these objectives over a 30 year period, and if they did so contemporaneously. That is, had permanent behavior change occurred as a result of the project? Furthermore, an outcome-evaluation limited to addressing the original project objectives runs the risk of reinventing the wheel. That is, it runs the risk of producing the kind of project evaluations that are already common—namely declaring success at a high rung of analysis, primarily by citing numbers served or numbers of trees distributed. As the literature review in Chapter 3 indicated, this has been a major criticism of the literature assessing the project (Escobar 1991; Campbell 1994). Therefore, a secondary component to this outcome-evaluation is to provide an overall assessment of changes in the area—changes on the part of farmers’ lives, changes in tree-planting behaviors, and ecological changes to the land.

In sum, the research question was formulated in such a way to facilitate the collection of data that would provide a fact-check on earlier claims of project success based on stated project objectives, provide an assessment of overall changes in farmer behavior and ecological changes to the area, and point to any correlations between continued tree-planting and other social, cultural, economic and ecological factors.
The research question: Nearly 30 years since the commencement of a major tree-planting project, which particular cultural, social, economic, and ecological conditions have influenced some Haitian farmers to continue to plant trees more than others?

Formation of Preliminary Hypotheses

In traditional exploratory research, hypotheses are generated after data is collected, for use in the later explanatory stage. Here, I departed from this traditional approach and proposed several plausible hypotheses based on the literature, site location, and research question. Due to research design authentic scientific hypothesis-testing is not possible. Instead, hypotheses are used as points of departure to search for relationships and correlations between the research question and the data. Thus, hypotheses are simply accepted or rejected based on the findings of the data. In all cases hypotheses posited that certain conditions would result in continued tree-planting by rural Haitian farmers:

1. **H.1**: Protestant farmers are more likely to plant trees on their land than Catholic farmers.
2. **H.2**: Wealthy farmers are more likely to plant trees on their land than poor farmers.
3. **H.3**: Farmers with large land holdings are more likely to plant trees on their lands.
4. **H.4**: Farmers who participated in Pwojè Pyebwa are more likely to plant trees on their lands.
5. **H.5**: Farmers who utilize agroforestry practices are more likely to plant trees on their land.

Objectives of Data Collection

The objective of data collection was to provide multiple and diverse data sets capable of being analyzed to: (1) generally address the research question; (2)
specifically address the preliminary hypotheses; (3) contribute to a solid evaluation of Pwojè Pyebwa against its stated primary objectives; (4) contribute to an overall evaluation of the project’s affect on participants’ lives; (5) provide qualitative statements about ecological changes to the area; and (6) establish a reliable baseline for a later explanatory research stage at the same site.

Sample

The realities of rural Fondeblan made sampling a somewhat challenging process. The absence of a well-functioning local government equipped to provide a basic demographic account of the site eliminated most possibilities for probability sampling. Furthermore, two months in the field did not provide enough time for the type of informal census that might facilitate probability sampling.

Therefore, I used purposive, non-probability sampling, with the goal of capturing a sample that had a high \( x \geq 50\% \) household-level participation in Pwojè Pyebwa. To achieve this goal, I used geographical cluster sampling, choosing four of the neighborhoods surrounding the location of the project nursery and seedling distribution site. Within each of these four clusters, a convenience sampling was taken, in the acquisition of approximately 15 interviews per cluster.

Thus, interviews \( n=61 \) with farmers were conducted in an geographical area delineated by a radius of between one to two miles, extending outward from the original nursery and seedling distribution site. While the Pwojè Pyebwa operations eventually extended to even the farthest neighborhoods of Fondeblan, this specific sampling approach was chosen for several reasons. In addition to the likelihood of yielding a high number of project participants, such a sample was also expected to have substantial numbers of participants who planted in the early years of the decade over which the
project was implemented. The land of these planters was more likely to provide windows into ecological changes such as soil conservation or amendments.

**Data Collection**

Data were gathered within the sample parameters as outlined. I conducted semi-structured interviews with 61 heads-of-households, during which time a wealth of information was gathered on variables designed to be accurate measures social, cultural, economic and ecological conditions. The variables employed are provided in Table 4-1.

**Table 4-1. Variables measured in data collection**

<table>
<thead>
<tr>
<th>Variables</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. age</td>
<td>14. ownership or access to of rak bwa</td>
</tr>
<tr>
<td>2. animal types</td>
<td>15. participation in project</td>
</tr>
<tr>
<td>3. crop types</td>
<td>16. religion</td>
</tr>
<tr>
<td>4. literacy</td>
<td>17. remittances</td>
</tr>
<tr>
<td>5. livelihood ranking</td>
<td>18. sex</td>
</tr>
<tr>
<td>6. N of children</td>
<td>19. size of total land owned</td>
</tr>
<tr>
<td>7. N of different crops grown</td>
<td>20. soil types</td>
</tr>
<tr>
<td>8. N of different trees on land</td>
<td>21. tree cutting</td>
</tr>
<tr>
<td>9. N of people per household</td>
<td>22. tree planting b</td>
</tr>
<tr>
<td>10. N of uses for trees</td>
<td>23. tree species on land</td>
</tr>
<tr>
<td>11. N* of different animals owned</td>
<td>24. use of agroforestry practices</td>
</tr>
<tr>
<td>12. other land-holdings</td>
<td>25. wealth</td>
</tr>
<tr>
<td>13. own land</td>
<td></td>
</tr>
</tbody>
</table>

Notes: N* = number, b = y-variable; research question

The analysis of these variables in the subsequent chapter will have no meaning if they are not properly operationalized. Appendix A provides brief description of what was measured by each variable.

**The Logic behind Targeting Heads-of-household**

A note should be made in regard to targeting heads-of-household. As outlined in Chapter 2, a political ecology approach is interested in examination at multiple levels—international, national, regional, local, and household. Chapter 2 discussed the
existence of another level, the *lakou* (compound), between the local and the household level. Such a level would prove interesting to examine, though data were not collected at this level because individual household decisions are said to be autonomous of lakou arrangements:

In times past it is reported that the lakou functioned at least to some degree as an economic unit, elder parents retaining some authority over the economic activities of even their married children. If this structure in fact existed, it has long since disappeared throughout rural Haiti. The pattern today is for each household to function somewhat autonomously as an economic unit, though there are labor and food exchanges which do occur. (Murray 1981:3)

Thus, while the lakou may be acknowledged as a rung for examination, data in this research were gathered specifically at the household level in light of the economic autonomy described by Murray.

**Supplementing Primary Interviews**

Farmers were not the only people interviewed for the purpose of data collection. Several interviews were also conducted with key informants, including the head of a Catholic peasant organization involved in a variety of development projects, the head of the Protestant mission who oversaw Pwojè Pyebwa operations in Fondeblan, and same mission’s development director who oversaw the later years of the project.

Finally, several trips to the central market were made on market days. The purpose of these trips was to find discover the local prices for various planks (timber) and bags of charcoal. Visits were also made to several carpenters to cross-check the plank prices given in the market place.

**Hiring a Research Assistant**

In a rather surreal experience during my first morning in Fondeblan, I watched a man cutting down trees on a tree-covered hillside across from the house where I was
staying. I climbed the hill and started a conversation with this gentleman. He identified himself by his work, stating that he was both a farmer and a charcoal producer. Jak (a pseudonym) and I became friends, and he would frequently accompany me on my trips out to visit farms. Noting that accompanying me he would lose out on daily money-making opportunities, he suggested that I monetarily compensate him at a level commensurate with local standards. I agreed.

Well liked in the community, Jak served as a gate-keeper, winning over the occasionally skeptical or reluctant farmer with assurances that I was a university student and had no ulterior motives beyond research related to Pwojè Pyebwa. Furthermore, Jak was creative and patient in discovering new and innovative ways to explain the definition of the occasional word that was new to my lexicon. Jak became a good friend, and it different ways we were able to give each-other sage advice on a variety of different subjects.

A Typical Day of Interviewing

Interviews with farmers were typically conducted each morning, shortly after sunrise. This approach was followed at the advice Jak, because starting early meant avoiding the hot afternoon sun and also increased our chances of catching heads-of-households before they departed for the day’s work in the field. This interview schedule was occasionally altered at Jak’s recommendation—usually coinciding with strong rains the day before that would result in farmers leaving their houses early to plant the season’s pitimi (sorghum). On such days, interviewing started after noon, under the unrelenting Caribbean sun.
Regardless of the early hour that interviewing started most mornings, I was usually soaked in sweat by the time I arrived at the first farm. This is due to the fact that Haiti is a very mountainous country, and the rollercoaster of crisscrossing small mountain paths that lead to different farms ensured a vigorous work-out session. Any initial fears about my ability to perform fieldwork that involved so much walking abated after the first day, and I began to enjoy the beautiful vistas and lively conversations with Jak that such mornings provided (My afternoons were spent recovering from these long excursions).

When a farm was first approached, Jak would bellow out “onè” (honor), or “kay gen moun?” (anybody home?). This nicety ensured that no one was caught off-guard. If someone appeared, we would usually enter the lakou (communal courtyard). I would start by introducing myself, explaining the purpose of my research, and asking if a head-of-household was home. When absent, the farm was skipped and if possible, returned to later. When the head-of-household was present and summoned, I would again explain my research and ask if they were interested in participating through an interview. Most farmers graciously and enthusiastically agreed, and were subsequently read an informed-consent statement in Haitian Creole. They were then interviewed in a semi-structured manner that allowed them to talk at their own pace and provide qualitative data, while also allowing me to occasionally steer the course of the conversation for purposes of collecting quantifications on specific variables.

**Tools Utilized**

The primary tool used in interviews was a small digital voice-recorder, which directly records onto SD disks. The mechanism, smaller than a cell phone, recorded each interview as a separate file. The SD disks are removable, and are already in MP3
format when transferred to a computer. Furthermore, the digital voice-recorder had playback features which allowed me to slow down the recordings—a useful feature when re-listening to recordings of the occasional rapid rural speaker. Additionally, a clipboard, pen, and paper were used to make other observations about farmers’ lives, such as whether or not they lived in a cement house, to jot down new words, and to note other observations particularly related to ecological features. Finally, a ruler was brought along to measure the three largest trees in each farmer’s yard. I later discovered this to be a rather fruitless endeavor, as different trees grow at different rates in different soils and ecological conditions. Nevertheless, the measurements provided a way to learn about different trees while soliciting estimates on their age from farmers. All tree trunk sizes were taken at breast level, or approximately four feet.

Between three to five interviews were conducted every day, depending on factors such as the weather, the strength of the interviewer, the distance traveled from the point of departure, and the ability to find farmers at home.

**Transcribing the Interviews**

A substantial amount of interviews were transcribed each night by diesel generator-powered light, flashlight, or candle light. Interviews were transcribed directly into Haitian Creole. A portion of these interviews were submitted to Haitian Creole professor Dr. Benjamin Hebblethwaite as part of a summer-long independent study contract. Some excerpts from these transcripts are used in the following chapters of this thesis, and represent some of the qualitative contributions to this research.
Mining the Data

I learned the hard way that it is more desirable to conduct interviews with sheets of paper that can be used to directly record quantitative data. Unfortunately, in my case most such data were embedded in the audio recordings of the interviews. This required re-listening to all the interviews in order to “mine” the quantitative data out of their embedded context. While certainly improving my Kreyòl, this effort took quite some time. Nevertheless, listening to each recording multiple times ensured that the numbers and quantifications were correct. Eventually everything was sorted out and my data sets were ready to be analyzed.

Analysis of Primary Data

To look for correlations that could address the research question and the preliminary hypotheses, quantitative data were analyzed with PASW v.18.0.1\(^9\) (2009). All variables were measured against the dependent variable—whether or not farmers currently plant trees on their lands. Analysis began with chi-square tests, performed on all outcome variables. A logistic regression was then performed on all outcome variables that demonstrated initial significance. Due to design, results are not predictive, but the analysis is strengthened by descriptive statistics, qualitative findings, and by supporting literature on the topic. The results of the data analysis are presented and discussed in a mixed format in Chapter 5.

\(^9\) PASW is software commonly used by social scientists in the analysis of quantitative data.
CHAPTER 5
RESULTS AND DISCUSSION

Introduction

In this chapter I provide a qualitative assessment of Fondeblan in 2009, and discuss the results of quantitative data analyzed to address the research question. This chapter is comprehensive—it addresses the findings on all variables outlined in Chapter 4 and defined in Appendix A. Where statistical significance was discovered, further discussion and extrapolation ensue. When possible, findings are related back to findings presented by an earlier anthropologist in the area (Balzano 1986; Balzano 1989; Balzano 1997). While data from Balzano’s sample and my sample are sometimes loosely compared, the non-random nature of my sample makes definitive statements of shifts or changes impossible. Furthermore, the findings suggested by my data cannot be extrapolated beyond the sample. The findings discussed below inform the conclusions presented in Chapter 6.

A Qualitative Assessment of Fondeblan In 2009

I first arrived in Fondeblan in July of 2009, having spent the two previous weeks in neighboring Bèl Rivyè. The initial thing that struck me about the area was how many of the hills were covered with trees. I was born approximately 55 miles (~90 kilometers) from this area, and have traveled between Okay (Les Cayes) and Pòtoprens (Port-au-Prince) on numerous occasions, and as recently as 2001. Never in my life have I seen this kind of tree cover in Haiti. I observed my first rak bwa (parcel of tree-covered land) in Bèl Rivyè—but only one. Fondeblan appears to be full of rak bwa. Figure 5-1 displays photos of rak bwa in the hills surrounding Fondeblan.
Figure 5-1. Photos of “rak bwa” in the hills surrounding Fondeblan.
Fondeblan has undergone major changes since the first days of Pwojè Pyebwa. The existence of a large Catholic-run hospital in the area is illustrative of such changes. Fully equipped with four-wheel drive ambulances, this hospital serves Fondeblan and the surrounding areas. The hospital also ushers in medical teams on a regular basis.

I soon learned of another development in the area that is both new and contentious—a large, half-finished structure in the middle of the local marketplace. The government decided to build a new and improved covered-market, but ran out of money before the structure could be completed. According to residents, the giant slab of cement with no roof accomplishes little more than serving as a solar conduit that radiates undesired heat, and thickens traffic in the market by limiting the space available for vendors. See Figure 5-2, which displays a photograph of the crowded market and the new cement structure. Residents also report that commodity commerce has increased in the Fondeblan market, providing additional livelihood inputs beyond traditional cash-cropping.

A third interesting development is the extent to which communication technology has reached this rural corner of Haiti. The area has a large satellite-signaled internet café, run by the Catholic hospital. I also noticed many cell phones in use.

Despite wide-scale tree cover, new developments in the market, and increased access to communication technologies, Fondeblan remains an area largely involved in the agricultural endeavor.

**What the Data Suggest**

I started my data analysis by running chi-square tests on each individual outcome variable against my dependent variable. Using all outcome variables that showed initial significance, I ran a simple logistic regression. Because my expected cells counts were
less than five, the most appropriate test for significance was Fisher’s Exact. The regression model and the chi-square tests of variables that demonstrated p-values of significance are listed in Appendix B.

The logistic regression indicated four variables of statistical significance related to the y-variable\(^{10}\). This test suggests that the outcome variables most closely correlated with farmers’ decisions to plant trees are: (1) the number of different tree species already on household land; (2) whether or not farmers participate in agroforestry practices; (3) the number of different types of animals a household keeps; and (4) how trees rank in overall household livelihood strategies.

I approach the analysis of these significant variables and other in a mixed results and discussion format. The findings are disaggregated into the following three sections that provide a thorough review of the data and paint a solid picture of life in Fondeblan: (1) The Farmers; (2) The Land; and (3) Land Uses and Livelihood Strategies. This disaggregation is not meant to deny the important ties and relationships between these three categories. It simply serves the purpose of organizing the data in a matter whereby specific findings on specific topics can be easily located. This approach is supplemented by the voices of Haitian farmers, transcribed from the interviews I collected. The goal is to present the qualitative and quantitative findings in a context that is both meaningful and interesting.

\(^{10}\) The y-variable (tree planting; see Chapter 4) is a binomial categorical variable representing the primary research question—whether or not farmers currently plant trees on their land.
The Farmers

This first section provides a demographic analysis related to the farmers themselves. Subsequent sub-sections detail land characteristics and land uses.

Age
The sample captured farmers of all different ages. An interesting phenomenon would often surface when I asked heads-of-households what age they were. Many of the younger people knew exactly how old they were, and responded immediately with a discrete number. However, many respondents over the age of approximately 40 often paused when asked how old they were. Sometimes they would think for a while and offer a number, other times they would tell me the year in which they were born. Often they would yell for one of their nearby children or kin to ask them how old they were. Interestingly, their children most often knew exactly how old their parents were. Perhaps this phenomenon is reflective of the older generation’s conception of time, while the newer generation—often attending school, wearing watches, and some using cell phones—is more grounded in western calendrical conceptions of time.

The youngest farmer interviewed was 18 year old, and the oldest was 90 years old, with a mean sample age of 49.75. Consider Figure 5-3, which displays three graphs: (1) a histogram of the actual age distribution of my sample, with a normal curve; (2) a bar graph of ages in Balzano’s 1986 sample, distributed by age categories; and (3) a bar graph of ages in my 2009 sample, distributed by age categories. Comparing the second and third bar graphs displayed in Figure 5-3, it becomes apparent that a key

\[\text{\footnotesize \[Rural Haitians often mark the progression of time by the occurrence of major events such as the deposition of political leaders, hurricanes, and earthquakes.}\]
difference of distribution in these two samples is that a higher percentage in Balzano’s sample fell in the 51-65 age category. In my sample, ages were more evenly distributed between the 36-50 and 51-65 categories. Unfortunately, my sample was not random and therefore cannot be compared to Balzano’s sample and extrapolated to Fondeblan in general. Nevertheless, loose comparisons can be made with this fact kept in mind. One possibility for these differences in age distribution of heads-of-households may be attributable to out-migration in the area. That is, because people continued to migrate out in the time between Balzano’s study and my study, more land has become available earlier for younger people in the current era, resulting in the more equal distribution between two age categories in my sample.

**Gender**

A large percentage of households in Fondeblan are woman-headed. In Balzano’s sample, 16.5% of households were headed by women. He notes that this is higher than expected, and attributes this percentage primarily to outward migration of men (Balzano 1986:vii). In my sample 34.4% of households were headed by women—over twice the percentage in Balzano’s sample. Admittedly, postulations of change are not possible due to the non-random nature of my sample. Nevertheless, loose comparison is possible. My initial inclination was that the large difference of woman-headed household between our samples was a reflection of a continued and increased out-migration that Balzano hypothesized. I conducted a cross tabulation between my ‘gender’ and ‘remittances’ data sets, yet no correlations were revealed. Thus, the high percentage of female-headed households in Balzano’s sample, and twice that percentage in my sample could be attributable to increased out-migration, though such
migration does not necessarily correspond with remittances sent to those left behind. As one woman shared with me, her husband had left her and her two children years ago to work in French Guiana. While he calls on a regular basis, he is unable to send money home and unable to secure the funds to return.

Balzano recently stated that he would now attribute any increase in female-headed households to the consequences of proletarianization initiated by the aforementioned non-governmental agencies working in the area. According to Balzano, there has been no observed gender imbalance among the Fondeblan Diaspora (Bazano 2010, personal communication).

Remittances

Balzano did not collect data on remittances, though 62% of his sample indicated they had at least one family member working overseas. I did not collect data on the number of households with members overseas, but instead on the number of households receiving remittances from relatives abroad. Thus, comparisons between these data sets are speculative at best. Approximately 13% of households in my sample receive some level of support from relatives living in other cities or abroad.

The Number of People per household

Balzano found an average number of people per household of 4.98. In my sample, the average number of people per household was 5.62. These differences are very slight, suggesting very little change in the average number of people per household over the period of approximately twenty-five years between the collection of these data. Again, these comparisons are speculative, given the non-random nature of my sample. Figure 5-4 contains two bar graphs that display the average number of people per
household from: (a) Balzano’s sample; and (b) my sample. The similarity of these two graphs suggests the potential of little change in household number levels.

**Children**

My sample found that heads-of-household in Fondeblan have, on average, 4 children. These children currently reside with the head-of-household, reside elsewhere in Fondeblan, or have migrated out to other areas. Balzano collected no information on numbers of children.

**Religion**

Approximately 85% of the respondents in Balzano’s sample reported that they were Catholic. Ten years later, Balzano reported that he suspected those numbers had evened out dramatically\(^2\). My sample appears to support Balzano’s initial suspicion—inhabitants in my sample fell fairly evenly along the lines of Catholic and Protestant, at 46% and 49%, respectively. Only two informants indicated they sèvi lwa (practice the folk religion that western scholars have come to call *Vodou*), and one was the local ounGAN (Vodou priest)\(^3\). One respondent identified as an atheist. This struck me as somewhat unusual. When pressed, he simply offered that he had lost his way, and no longer believed in God. This respondent’s house was the worst of all the different types of houses I observed in Fondeblan, seeming to confirm the hard times he had fallen upon. Normally such houses are only temporarily occupied—built when a farmer needs to stay near a far-off field, away from his permanent home. See Figure 5-5, which contains a photograph of the atheist's house, along with other house-types I observed.

\(^2\) See the literature on Fondeblan, Chapter 3.

\(^3\) See Chapter 3 for an explanation of the complexities involved in comprehensively measuring religious affiliation in Haiti.
Figure 5-2. The new and unfinished structure in the marketplace at Fondeblan, pictured on the left in both photos.
Figure 5-3. Age distributions in Fondeblan: (1) Actual Age Distribution with Normal Curve from 2009; (2) Categorical Age Distribution, by percentage from 1985; and (3) Categorical Age Distribution, by Percentage from 2009.
Figure 5-4. The average number of people per household from: (A) Balzano’s sample, 1985; and (B) my sample, 2009
Figure 5-5. Different types of houses observed in Fondeblan.
As highlighted in the literature review on Fondeblan, Balzano contributed the shift in religious affiliation that he perceived—from a predominance of Catholic religious affiliation to a more evenly distribute affiliation between Catholicism and Protestantism—to the activities of the local Protestant mission. I suspect he is correct. The local Protestant mission is involved in road improvement projects, cooperatives, water projects, animal husbandry projects and educational projects. Perhaps most influential in this perceived shift of religious affiliation has been the Baptist mission’s involvement in evangelism and church construction (see Thomas and Fendall 2003).

In Balzano’s very recent trip, interviews have led him to suspect a return-shift to Catholicism. Two-thirds Catholic to one-third Protestant is where Balzano would place the current religious affiliation in Fondeblan (Balzano 2010, personal communication).

**Wealth**

As indicated in my definition of variables\(^{14}\), the presence of a cement house was used as a proxy for wealth. The use of this proxy circumvented uncomfortable inquiries into people’s income levels, in addition to addressing inadequacies in measuring gains through informal exchanges or within internal markets—i.e. non-cash exchanges such as labor exchange or trading. The overarching assumption—one employed by Balzano as well—is that because construction with cement is very expensive, those households residing in cement houses\(^{15}\) can be deemed “wealthy” and those in mud or thatch houses can be deemed "not wealthy." Again, see Figure 5-5, which displays photos of some of the different types of houses found in Fondeblan.

\(^{14}\) See APPENDIX B.

\(^{15}\) Balzano measured cement cisterns, while I measured cement houses. See CHAPTER 4.
Using the presence of cement as a proxy for wealth was helpful in looking for correlations between wealth and tree-planting in Fondeblan, because one of my initial hypotheses was that wealthier farmers would be more likely to plant trees than non-wealthy farmers. Balzano found that only 6.5% of people in his sample owned a cement cistern. Within my sample, 44.3% of households resided in a cement house.

Acknowledging sample-influenced limits on comparability, the perceived differences in the ownership of a cement house between Balzano’s sample and my sample could be attributed to a variety of different influences. First, there could be an increase of available capital as the area shifts from historically agrarian activities toward more commerce. Second, families may have saved enough money since Balzano's time to since construct cement houses. Another possibility is that these houses were built with remittance money sent from abroad. One household I visited had about seven men working on a large (for the area) new cement house. When I asked them whose house it was, the indicated they were building it for a relative that lives in New York. Whatever the case, differences between the samples suggest that Fondeblan appears to have experienced an increase in the number of cement houses—perhaps reflective of an increase in wealth or in expendable capital.

**Education**

While no relationships of statistical significance were noted between wealth and tree-planting, an interesting correlation surfaced in cross tabulations between wealth and education in my sample. Approximately half of my entire sample fell in the quadrant of "not wealthy" and “illiterate.” This makes logical sense, as expendable income is required to send children to school. Meanwhile, the other half of my sample, falling in
the “wealthy” category is fairly evenly distributed between literate and illiterate. From these data I extrapolate a connection between a lack of education and poverty, though the presence of wealth in Fondeblan does not appear to result in a large increase in education levels. As association does not imply causation, this correlation is admittedly speculative.

In Balzano’s sample, 34% of farmers surveyed indicated they had some formal education. My sample indicated a literacy rate of 32.8%. Between these two samples, education levels appear to have fluctuated little in a span of approximately 25 years. However, due to the non-random nature of my sample, neither extrapolation to Fondeblan as a whole, nor proclamations of demonstrated change over time are possible. In spite of this fact, comparison should not be shunned entirely. An increase of wealth independent of an increase in education may be due to other factors already discussed in this chapter—namely remittances, family savings, or a gradual shift from agriculture to commerce. It is also possible that some families choose to invest capital in their house as opposed to in their children’s education. Further extrapolation on this issue is beyond the scope of this paper and beyond the level that data were collected at.

**Participation in Pwojè Pyebwa**

In Balzano’s random survey of 99 residents, 46.4% were participating in Pwojè Pyebwa. In my sample, 73.8% of respondents indicated that they had participated in Pwojè Pyebwa. If these two samples were solidly accurate representations of Fondeblan at large, one might suggest that this difference could be due to continued tree seedling distribution as the projected continued for some time after Balzano
departed. While the chi-square test between project participation and current tree-planting revealed no statistical significance, approximately half my sample had both participated in the project in the past and currently plant trees.

The Land

Land Ownership

In Balzano’s sample, 81.5% of households owned some portion of land. In my sample, 95.1% of households owned some portion of land. Balzano’s land ownership percentage is consistent with data from censuses carried out in 1950 and 1971 indicating between two-thirds and 80% of Haitians own land (Zuvekas 1978:77). My land ownership percentage is notably higher than Balzano’s, and may be a reflection of any number of factors. One possibility includes an increase of expendable capital in the area due to increased market access that led to an increase in land purchase. Another possibility includes more available land due to out-migration. Another possibility includes more land availability due to land divisions through inheritance. A final possibility includes sampling bias or error.

Ownership of Multiple Land Parcels

Balzano found that of his sample, the number of different parcels of land owned per household averaged between three and four. While I did not gather data on the number of parcels owned, I did gather data on whether or not households owned additional land beyond that on which their house was situated. In my sample, 83.6% of households indicated they own additional parcels.

Land Sizes

Balzano did not collect data on land sizes. I did collect these data, though it was challenging for a variety of reasons. First, not all farmers knew exactly how much land
they had, or were not interested in disclosing the quantity. Consider this farmer’s response to my question of how much land he owns:


(We don’t have a lot. We don’t have a lot, but that is because there are many people in the family who are holding land. Each has one piece, one piece, one piece. But this piece has become valuable. I don’t know the value. But each person has a piece).

With such farmers, getting reliable numbers required a process narrowing down the possibilities by asking if they owned more or less than a certain amount of land. For example, if they indicated they owned more than a *kawo* (in French, *carreau*; 1.29 hectares), I would ask, *eskè ou genyen plis pase yon kawo* (do you have more than a kawo)? If they responded “no,” I would narrow down further, if they responded yes, I would scale up further, and so on. This process often required return visits to farms and what may have been estimations on the part of some farmers.

A second challenge was related to the Kreyòl word “ka,” which can mean a variety of things, including “could be”. “Ka” is also another way of saying kawo. Finally, “ka” also means “1/4th”. Therefore, a farmer might respond, *li ka ka e ka* (it could be a kawo and 1/4th). However, this same phrase could simply be emphatics (common in Kreyòl), stuttering, or simply the repetition one makes when one is estimating.

Luckily all interviews were audio recorded and I was able to listen multiple times to ascertain the correct land sizes. As is the case with much in Kreyòl, everything is context¹⁶.

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¹⁶ Kreyòl doesn’t gender nouns, for example.
Average land size in my survey sample is 2.6 hectares (ha), with approximately one third of the sample owning less than a hectare, another third owning more than 2 ha, and the final third falling somewhere in-between. These figures are notably higher than previous national estimates, which placed the mean land-holding at 1.5 ha (Zuvekas 1979).

One original hypothesis was that the larger their land-holdings, the more likely farmers would be to plant trees on their land. This theory has been supported to some extent in the literature (Balzano 1986; Bannister and Nair 2003). The assumption was predicated on the idea that with more than enough land to grow crops, remaining land would be utilized for income generating trees. An analysis of the data indicated no such trends. Next, land-holdings were regrouped categorically into small (x<1 hectare), medium (1 hectare< x <2 hectares), and large (x>2 hectares) units of analysis and reexamined for significance. No significance was found. Therefore, in the case of my Fondeblan sample, size of land-holdings appears to bear no direct correlation on tree-planting decisions by farmers.

Assuming no margin of error in the collection of land sizes, one possible explanation might be that farmers with large plots of land prefer to rent their extra land, as opposed to planting trees there. However, I am fully aware of the possibility of errors in the collection of land sizes. Future research will require walking the perimeter of all parcels claimed by a farmer, to establish stronger confidence in land size figures offered by farmers.
Soil Types

In addition to many trees, Fondeblan displays a wide variety of different soil types. As noted by Balzano, and confirmed in my research, the local farmers have developed a soil classification that is largely based on the color of the soil. Farmers reported tè nwa (black soil), tè wouj (red soil), tè jòn (yellow soil), tè blanch (white soil), and tè wòch (rocky soil). Figure 5-6 displays a pie chart of different soil-types farmers indicated their land contains, by percentage of each type named. If farmers named more than one type of soil, their response is listed under the “mixed soil” category. Generally speaking, these soil types form a spectrum, with tè nwa as the most coveted and tè blanch as the least productive. Tè wòch seems to be an exception to this classification. As Jak pointed out one morning, tè wòch kenbe dlo anba (rocky soil retains water underneath). Dr. Bannister has called this phenomenon “rock mulch.” Essentially, these rocks serve as a shield from the sun, protecting water held by soil deposits lower in the profile, which have long since drifted below the rocks. The most coveted soil dominates, with approximately one-third of farmers claiming their land was tè nwa. Mixed soil and tè blanch follow at 26.23% each. Tè wòch and tè jòn are the least common soils found on the lands of farmers in the sample, named at 6.56% and 3.28%, respectively.

Tree Ownership

Tree tenure in Fondeblan and in much of rural Haiti is related to land tenure, in such that the owner of a parcel of land generally owns the rights to the trees on the land. However, creative arrangements can be reached:
Figure 5-6. Distribution of soil types on farmers’ land in Fondeblan, by percentage.
If the ultimate disposal of the trees can be arranged for by agreement of all the parties involved, then the issue of land tenure becomes muted. . . . For example, one kiltivatè [farmer] who sharecrops a parcel of land in Mòn Zèb [pseudonym for Balzano’s research site in Fondeblan] planted trees on this land after coming to an innovative agreement with the landowner about the disposition of the trees. They bent the prevailing rules of tree tenure by deciding that the sharecropper would plant, care, and receive one-half of the worth of the trees [after they] are harvested. (Balzano 1986:33, brackets mine)

I found a similar situation in my sample, which included only three households which do not own land. Having read Balzano’s account, I asked one informant if such an arrangement could be made, to which he responded, wi, fifti fifti (yes, fifty-fifty). That is, the land owner would take a 50% cut of whatever trees were taken from the land.

**Number of Different Trees on Land**

Farmers were asked to name all of the different types of trees on their landholdings. Initially I had planned to use free-listing to determine which trees were the most important, under the assumption that farmers would name the most frequently used trees first. I quickly noticed that farmers would often start by glancing around while naming the trees visible to them. After naming the trees within visibility, they would continue to name trees without glancing around. Therefore, I decided that free-listing wouldn’t be an accurate measure of which trees have the highest value, and therefore abandoned the free-listing method.

Farmers listed many different tree types on their land. On average, farmers had approximately six different species of trees on their land. Consider Figure 5-7, which displays how many times 42 different documented tree species were named when heads-of-households were asked to name the types of trees they have on their land. The most frequently named species were pomelo (Citrus maxima) and orange (Citrus spp.), named 35 and 42 times, respectively. That is, over half of the 61 informants have
these trees on their land. It is not immediately clear if either one of these tree species were aggressively distributed through Pwojè Pyebwa, as fruit trees were only added later in some locations—'wood' trees were promoted in the original design (Murray 1981).

Haitians are generally very reluctant to cut their fruit trees, made further evident by the high number of times that coconut (*Cocos nucifera*) and avocado (*Persea Americana*) were named, at 25 and 27 times, respectively. As one farmer put it:

*Si pyebwa...si se yon pye fwi, li...ou gade wè l vin...pa ka fè fwi ankò, li granmoun, kounye a w koupe l. Konprann? Men si l jenn, chak ane ou rekòlte, non, men se pa posib ditou pou koupe l.*

(If the tree...if it is a fruit tree, it...you see how it has become...it can’t give fruit anymore, its old, now you cut it. Understand? But if it’s young, each year you harvest, no, it is not possible at all to cut it).

Of interest, the third and fourth most commonly named tree species were Pwojè Pyebwa trees—cedar (*Cedrela odorata*) and neem (*Azadirachta indica*), named 34 and 31 times, respectively. Balzano never saw cedar trees being distributed during his research period from 1985 to 1986, and has stated that there is a long tradition predating Pwojè Pyebwa of planting cedar in Fondeblan (Bazano, personal communication 2010). However, multiple farmers indicated to me that their cedar trees were in fact given to them by the project. Whether or not Pwojè Pyebwa distributed cedar in Fondeblan is a question that needs to be researched further.

That cedar and neem trees have incredible regenerative tendencies in Fondeblan should be noted. I observed many volunteer neem trees along the main road, side roads, foot paths, and in many people’s yards. Stumps of neem trees were frequently observed coppicing with multiple shoots, many of sizeable amounts. Consider Figure 5-8, which displays coppicing neem trees in Fondeblan. Cedar volunteers were
also observed widely, though more frequently in people yards. Indeed, neem and cedar are the most common “wood tree” species I observed in Fondeblan.

The initial variable, which measured the number of different tree species on a farmer’s land, did not generate statistically significant p-values. When restructured as a binomial variable, the Fisher’s Exact Test\(^{17}\) indicated a p-value of 0.021 for the portion of the sample with six or more different species of trees. That is, farmers with more than six different types of trees are more likely to plant trees. I suspect that farmers with many different types of trees on their land have made their land this way—that is, there are many species present because they plant trees there or permit volunteers to grown. If this is the case, the correlation here is more observational than causal. That is, it is not likely the case that farmers with many different kinds of trees on their land will plant trees more, so much as it is the case that some farmers have more trees on their land simply because they have planted more trees. Another explanation of the observed p-value significance is that farmers with many different species of trees on their land currently plant trees because they make money from a variety of different trees.

**Ownership or Access to Rak Bwa**

The presence of *rak bwa* (wood lots) has already been discussed\(^ {18}\). These woodlots or vestiges of original forest cover many of the hills in the Fondeblan area. In my sample, 45.9\% of farmers indicated that they own or have communal access to rak bwa. Communal access here simply means that a rak bwa exists on land inherited by

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\(^{17}\) See APPENDIX B.

\(^{18}\) See the literature review on Fondeblan, Chapter 3.
Figure 5-7. Number of times 42 different documented tree species were named by heads-of-households in Fondeblan.
Figure 5-8. An example of widely observed coppicing neem (Azadirachta indica) trees in Fondebian.
siblings and undivided. Balzano noticed a similar trend, when he reported that "between 35% and 57% of all AOP [Pwojè Pyebwa] plantation sites were found to be on unseparated inherited land (tà minè) or sharecropped land" (Balzano 1986: 36). Thus, informal arrangements for the use of rak bwa exist, and need to be further researched.

While ownership or access to rak bwa did not generate statistical significance in the chi squares or the logistic regression, a small level of statistical influence was noted in the Fisher's Exact test, with a p-value of 0.09.

Livelihood Strategies

The vast majority of inhabitants in Fondeflan can be described as farmers employing multiple livelihood strategies. While some inhabitants are involved in small-scale commodity commerce, virtually all inhabitants grow crops on their land, tend animals, and to a varying degree utilize trees to supplement their income. Here, these strategies, with the exception of small-scale commodity commerce, are examined.

Animals

A total of eleven different types of owned animals were named in the Fondeflan sample. Animals named include goat, pig, cow, pigeon, sheep, turkey, horses, mule, donkey, guinea fowl, and chicken. Within the sample, 90.2% of households owned at least one animal. The maximum number of different kinds of animals owned by one household was 8, and this was an exception. The average number of different kinds of animals owned by a household was 2.88.

Consider the bar graph in Figure 5-9, which displays the number of times each different type animal was named within the sample. Goat and chicken were the most
Figure 5-9. Number of times 11 different documented animals were named by heads-of-households in Fondeblan.
common in the sample, both named 42 times. Pig was next—named 32 times, followed by cow—named 22 times, and donkey—named by approximately a third of the sample. Balzano recorded some information on the percentages of households owning certain animals. Balzano noted a goat ownership percentage of 70 in his sample. In my sample the percentage of households that own a goat is similar, at 68%. In Balzano’s sample, only 4% of households owned pigs, while in my sample 52.4% own pigs. This potential increase, noted here primarily as a difference between Balzano’s random sample and my non-random sample, could be attributable to the reintroduction of pigs by the local Protestant mission in the wake of the near island-wide pig slaughter of the 1970s-1980s19 (see Thomas and Fendall 2004).

In Balzano’s sample, 54.4% of households owned cattle. This is a notable difference from the percentage of cattle named in my sample, which was 36%. Balzano recorded that three-fourths of his sample owned a pack animal. If I combine my categories of horse, mule, and donkey, 36% of my sample owns a pack animal, indicating a hypothetical decrease in pack animal ownership. Such a decrease could be due to an increase in motorcycles or other forms of transportation in the area.

Finally, Balzano noted that 93% of his sample owned fowl. If I combine my categories of chicken, turkey, pigeon, and guinea fowl, 70.5% of my sample own fowl. .

The initial structure of my variable measuring the number of different animal types owned by a given household indicated little significance in the logistic regression. When restructured as a binomial variable, the Fisher’s Exact Test20 indicated a p-value of

19 Pigs were slaughtered throughout Haiti during this period, for fear of African swine fever virus.

20 See APPENDIX B.
0.018 for the portion of the sample with more than three different types of animals. That is, in my Fondeblan sample, farmers with more than three different types of animals are more likely to plant trees.

Animal ownership has long been believed to ameliorate tree-cutting (Jean Thomas 2009, personal communication). Conversations with farmers revealed that animals not only fetch a higher price than charcoal or timber, but that they may be sold much more rapidly. Farm animals serve as a rural bank for Haitian farmers and have been recommended as an important component for inclusion in natural resource projects in Haiti (Shannon 2001). This knowledge was reflected in the early years of Pwojè Pyebwa, when the initial seedling distributing organization was also involved in pig distribution and goat improvement projects (Balzano 1986). The director of a high-membership Catholic-based peasant cooperative in the area told me that the purpose of their goat distribution program was primarily to ameliorate tree-cutting (Briel Leveillé, 2009, personal communication).

**Crops**

If free-listing wasn’t trusted in the case of trees, my mind was changed in the case of crop-naming by farmers. Nearly every single farmer queried about what crops they grow began their response in the same way: *nou plante mayi, pitimi, pwa...* (we plant corn, millet, beans...). Variation occurred after these three were named, indicating that they are the staples of the area.

All told, 16 different crops were reported as being grown\(^\text{21}\), though additional crops were occasionally observed in the marketplace. The largest number of different crops

\(^{21}\) *Banann* (plantain) was considered a tree, because farmers referred to it as a tree.
grown by a household was eight, and the smallest number of different crops grown by a household was two. The average number of crops grown by households is 4.6.

Consider Figure 5-10, a bar graph that displays the number of times each individual crop was named by heads-of-households in my sample.

**Trees**

Tree tenure, the number of different tree species, and access or ownership to *rak bwa* have already been discussed under the section entitled "The Land." In this section I briefly discuss tree-planting, tree-cutting, and tree uses by farmers in my sample.

In Balzano's survey, 46.4% of people indicated participation in Pwojè Pyebwa, but he did not provide information on the number of people that planted trees. In my sample, 70.5% of respondents indicated their household plants trees. When asked where they get their seedlings, respondents indicated they bought trees, assisted volunteers, or found trees in different locations and transported them to planting sites.

Consider this farmer's responds to my query:

Andrew: Epitou, èske ou plante pyebwa sou tè w?
Enfòmatè: Wi.
Andrew: Ki kote ou jwenn ti bwa pi pitit pou plante?
Enfòmatè: Lè yo respouse ankò, lè yo fè ti grenn, lè lapli tonbe ou jwenn ti grenn nan, w gen dwa pran youn, ou plante sou tè w, pou apre sa l vin grandi.

(Andrew: And, do you plant trees on your land?
Informant: Yes.
Andrew: Where do you find the seedlings to plant?
Informant: When they grow back again, when they make seeds, when the rains falls you find the little seeds, you can take one, you plant it on your land, and after that it begins to grow).

These sorts of responses were very common in my sample. Respondents from one neighborhood indicated they received free trees from a gentleman in another zone.
Figure 5-10. The number of times 16 different documented crops were named by heads-of-households in Fondeblan.
Unfortunately, I do not have exact quantifications of where tree seedlings were procured. I can confidently say that approximately half of the sample indicated they simply found seedlings and transported them to their lands. Consider Figure 5-11, a photo of cedar (Cedrela odorata) tree volunteers which one farmer had transferred to plastic bags, to plant at another location.

Many farmers indicated they could receive more income from trees than from crops. When asked why they didn’t plant more of their land with trees, a common response was a lack of space, or the longer time required to wait. Consider this farmer’s response:

Pyebwa, pafwa, lè w ap plante li, sa k fè w pa ka kontinye plante pyebwa...ou ka plante yon pyebwa, e ou kapab jwenn yon patisipasyon nan pyebwa apre twa, kat, senk ane. Men lè w fè rekòt sa a, ou plante té a, plant sa a, chak twa mwa, kat mwa, ou jwenn manje.

(A tree, sometimes, when you plant it, that can make you unable to continue planting trees...you can plant a tree, and you can make use of it after three, four, five years. But when you make this kind of harvest [corn], you plant the land, plant this [corn], every three months, four months, you find food).

Other farmers indicated they planted trees, but only along the borders of their property:

Lè ou plante pyebwa, l ap pran nan de tan pou l grandi, pou l vin fè kòb la. Ou gen dwa plante sou liyzè. Si w plante anpil sou liyzè, men ou pa plante nan mitan té a...depi ou plante nan mitan té a nèt, menm tankou menm pye fwi sa a, l ap touye l! Sa vie di ou plante sou li, sou ran. Si li [...] plante, sou li, li ap bon nan de tan, pou kite l grandi, pou fè gwo pyebwa yo ka siye.

(When you plant a tree, it takes time for it to grow to where it can make the money. You can plant on the border. If you plant a lot on the border, but you don’t plant in the middle of the land...since you plant in the middle of the land completely, the same, just like this fruit tree, that will kill it! That means you plant on it, in a row. If it...plant, on it [the border], it will be fine over time, to leave it to grow, to make big trees you can saw [to make planks]).
Figure 5-11. Cedar (*Cedrela odorata*) volunteers placed in plastic bags for planting, by a farmer in Fondeblan.
As for cutting trees, 78.7% of my sample indicated they partake in this activity. This is a slightly higher percentage than those who indicated they planted trees. One simple explanation might be that tree cutting is currently taking place at a higher percentage than tree-planting simply because a large number of trees of project derivation are currently reaching maturity—as determined by farmers. Tree-cutting in Fondeblan usually takes place with a machete, and is a very labor-intensive activity.

When asked why they cut trees, farmers invariably responded, *nou koupe lè nou bezwen* (we cut when we have a need). In the words of one particular farmer:

*Nou toujou koupe pafwa nan mwa ou pan gen lajan pou rete timoun lekòl, se pyebwa nou koupe pou fè lajan. Ou koupe l, ou fè chabon avè l, ou jwenn lajan nan chabon... pou ret timoun lekòl.*

(We always cut [trees], sometimes during months when you don’t have money to keep children in school, then we cut trees to make money. You cut it, you make charcoal with it, and you get money from charcoal…to keep children in school).

Further understanding about the motivations behind cutting or planting trees can first be understood in the context of what trees are used for. In interviews, farmers listed a total of eight different uses for trees, though I suspect several others exist. The largest number of different tree uses found in a household was five, and the average number of different tree uses for a household was 2.4. Consider Figure 5-12, a bar graph that displays the number of times eight different documented tree uses were named by farmers in the Fondeblan sample. Clearly, fruit is the primary use listed by farmers in Fondeblan. This is consistent with the frequency of fruit trees noted in Figure 5-7. Use of fruit does not require the cutting of trees. It is not clear whether fruit yields more income than charcoal or planks. Data were not collected on fruit prices and the fruit economy of the area. The second and third tree uses—charcoal and planks,
Figure 5-12. The number of times eight different documented tree uses were named by farmers in Fondeblan.
respectively—require the cutting of trees. Some of the other tree uses listed may be met by cutting branches instead of the whole tree. In the rural countryside, most farmers cook with branches and fallen wood, not charcoal. As one farmer explained it, *kòmsi nou anseyò, nou sèvi ak bwa, men gen kèk moun anseyò sèvi ak chabon an lakay li* (As we are in the country, we use wood, although there are some people in the country who use charcoal in their house).

**Agroforestry**

P.K. Nair is considered by some as one of the world’s foremost experts on agroforestry. I was fortunate enough to take his course on agroforestry at the University of Florida, where he defined agroforestry as “the purposeful growing of trees and crops and/or animals in interacting combination for a variety of objectives” (P.K. Nair, personal communication). Nair also stressed the “Four I’s” of agroforestry, indicating it is a scheme that is: (1) intentional; (2) intensive; (3) inter-active; and (4) integrated.

Agroforestry practices observed in Fondeblan were diverse and wide-ranging, reflecting: (a) farmer ingenuity; (b) Pwojè Pyebwa agroforestry recommendations; and (c) traditional systems that likely evolved due to the Haitian land-inheritance custom that informally divides existing land between all sons and daughters of the deceased (Murray 1977; Smucker et al. 2000). Thus, as inherited plots get smaller and smaller, the response has been to develop unique combinations of trees, plants, and animals that both diversify livelihood strategies and cope with limited land areas—agroforestry.

As Bannister and Nair have pointed out, “the way farmers practice agroforestry evolves over time as their experience matures, the characteristics of their fields changes, or their household resources increase or decrease with age” (Bannister and Nair 2003).
Thus, agroforestry as practiced in Fondeblan is not homogenous, and blanket statements about systems of practices would not be accurate.

Many farmers indicated that they mix trees and crops because trees *kenbe dlo* (hold water) and protect land from tropical storms and *siklòn* (hurricanes)—both of which may be considered behavioral choices in regard to perceived environmental services. Most of the agroforestry practices observed were using project trees. Consider Figure 5-13, which displays several agroforestry practices I observed in Fondeblan. Note the tethered goat in the picture on the left, and the presence of cedar (*Cedrela odorata*) and neem (*Azadirachta indica*) trees. Within my sample, 52.5% of farmers indicated that they practice agroforestry, generating the highest level of outcome variable significance in the Fisher's Exact Test, with a p-value of 0.001\(^ {22} \). That is, the data suggest that farmers in Fondeblan that engage in agroforestry practices are highly likely to plant trees.

**Livelihood ranking**

Trees are just one way in which farmers in Fondeblan generate income. Income can also be derived from the sale of crops or animals. Admittedly, some income may be derived from small-scale commodity commerce in the market, but only one person in my sample indicated involvement in such commerce. Thus, the vast majority of my sample generates most of their income through trees, animals and crops.

Farmers within the sample were asked to rank animals, crops, and trees in descending order, starting with the one that normally provides the most income in the course of a year, and ending with the one than normally provides the least income in the

\(^{22}\) See APPENDIX B.
Figure 5-13. Photographs of observed agroforestry practices in Fondeblan.
course of a year. Consider Figure 5-14, which displays farmers’ rankings of average annual income derived from animals (A), crops (C), and trees (T). The largest number of respondents listed an A, T, C ranking, indicating they derive the most annual income from animals, followed by trees, and ending with the crops they grow. The second largest ranking response also listed animals as most important annual income producer.

Very few people indicated that trees were their primary source of income, although over one-third listed them as the second most important income source. When the data are restructured to determine what percentage of Haitian farmers listed trees as first or second annual money-maker, two-thirds of farmers fall in this category. Thus, trees play a substantial role in the income-generating strategies of farmers from the sample.

Although farmers in the sample listed fruit as the primary tree use, it is unclear if fruit is sold for substantial amounts of income in Fondeblan. Given transport and shelf-life issues related to fruit, and the fact that most fruit trees in the area bear fruit at the same time, it is highly unlikely that fruit plays a major role beyond providing fodder for animals. On the other hand, charcoal is lucrative and produced nearly exclusively for the urban-bound market. Figure 5-15 displays a photograph of this thesis author sitting on charcoal bags—a common site in Fondeblan—placed along the side of the road and waiting for pick up by trucks that leave the area daily. Planks, while occasionally used domestically for the construction of doors or beds, are most often sold to local carpenters in Fond-des-blancs. Therefore, I cautiously conclude that charcoal and planks are the top income-producers within the tree-use category, and rank first or second in overall farmer livelihood strategies in Fondeblan.

23 Refer back to Figure 5-20
Figure 5-14. Farmers' rankings of average annual income derived from animals (A), crops (C), and trees (T).
Figure 5-15. Charcoal in Fondeblan, by the side of the road, and in one of many trucks that leave the area daily.
CHAPTER 6
CONCLUSIONS

Lessons Learned

This was an ambitious thesis. In retrospect I am amazed at the amount of data I was able to collect over a two-month period. In many ways, this was a "jump in the water to learn how to swim" exercise. Were I given the opportunity, I would redesign several components of my data collection methods, and ask additional questions that would have proved useful in my analyses. As the saying goes, ‘hindsight is 20-20.’ Nevertheless, some meaningful conclusions can be drawn from the research presented in these pages.

Revisiting the Research Objectives

It would do well to recall that there were three primary objectives of this thesis: (1) to add to the aging corpus of anthropological literature on human-nature interactions in Haiti; (2) to compile baseline data through exploratory research that would inform and contribute to a later explanatory research stage—my doctoral dissertation; and (3) to provide an anthropological, site-specific outcome-evaluation of Pwojè Pyebwa, approximately 30 years after its commencement.

Revisiting the Theoretical Orientation of the Thesis

The three thesis objectives were attempted from a political ecology perspective. This perspective and other preceding anthropological human-nature theories were examined briefly in the chapter on theory. I framed the problem—deforestation and its associated ecological and human crises—as a result of politics. Through the literature review, it was suggested that ecological destruction in Haiti has often been orchestrated from higher rungs—transnational, international or national level politics.
The concept of politics in this thesis was expanded to include policies and projects. Pwojë Pyebwa was briefly treated nationally, though primarily examined locally and at lower rungs of a political ecology analysis. Viewing Pwojë Pyebwa as a form of politics, one becomes aware of ways in which politics can actually have a beneficial effect on ecology. That is to say, not all politics are bad politics.

**Addressing the Research Objectives**

I hope to meet the first objective of this research. That is, I hope to continue researching ecological issues in Haiti, and making that research available to interested parties through the university and by publishing my findings. In a small way, I will have added to the corpus of anthropological literature on human-nature interactions in Haiti.

I expect to meet the second objective of this research. That is, I have received funding from the National Science Foundation (NSF) to continue researching tree-planting in Fondeblan. Thus, this research will serve as baseline data, and was most certainly an exploratory exercise. The explanatory stage will culminate in my doctoral dissertation.

In regard to the third objective, outcome-evaluations are usually measured against the fulfillment of the primary objectives of the project (read politics). In the case of Pwojë Pyebwa, the primary objectives were:

1. To motivate Haitians farmers to plant and maintain trees for the primary purpose of income-generation; and

2. To achieve the first objective in large numbers with secondary goals of soil conservation and improvement, provision of fuel-wood, and the provision of other environmental services (Murray and Bannister 2004).

My experience in Fondeblan appears to confirm what the initial literature had suggested—that both objectives have been fulfilled (Balzano 1986; Balzano 1989;
Balzano 1997; Clavissaint 1998; Thomas and Fendall 2003; Smucker 2007). Thus, as far as traditional outcome-evaluations go, Pwojè Pyebwa may be considered a success in the case of Fondeblan.

**Revisiting the Research Question**

As highlighted in the early chapters of this thesis, traditional outcome-evaluations of Pwojè Pyebwa left something wanting. While previous evaluations may have provided an excellent overarching assessment and history of the project, they were not contextualized in a specific place—they were generalized\(^2\). It was the general nature of such previous outcome-evaluations that drove the formation of my research question: Nearly 30 years since the commencement of a major tree-plating project, which particular cultural, social, economic, and ecological conditions have influenced some Haitian farmers to continue to plant trees more than others?

It was hoped that the research question would provide answers about receptivity to, and continuity of tree-planting, in the broadest sense. The broad nature of this research question was spatially contextualized in the location of Fondeblan, and temporally contextualized through an examination of literature on the area that spanned 30 years.

**Reexamining the Hypotheses in Light of the Data Analysis**

In addressing the research question, I would like to briefly return to the five preliminary hypotheses it generated:

**H.1:** Protestant farmers are more likely to plant trees on their land than Catholic farmers.

\(^2\) Some early evaluations exist, but were written within the decade of project operations.
H.2: Wealthy farmers are more likely to plant trees on their land than poor farmers.

H.3: Farmers with large land holdings are more likely to plant trees on their lands.

H.4: Farmers who participated in Pwojè Pyebwa are more likely to plant trees on their lands.

H.5: Farmers who utilize agroforestry practices are more likely to plant trees on their land.

For reasons elucidated in the Results and Discussion chapter of this thesis, hypotheses one to four failed to generate any statistical significance in the data analysis. Hypothesis five was the only one that generated significance, displaying the highest p-value of all the Fisher’s Exact tests. Therefore, based on the data I collected, I reject hypotheses 1 to 4 as being influential variables in continued tree-planting decisions of farmers in Fondeblan.

Variables of Unexpected Statistical Significance

While only one of the preliminary hypotheses generated significance, the following outcome variables generated unexpected significance: (1) the number of different tree species already on household land; (2) the number of different types of animals a household keeps; and (3) how trees rank in overall household livelihood strategies. When these three outcome variables are added to hypothesis number five, the result is the identification of four factors that correlate to concurrent tree-planting by farmers in Fondeblan.

Answering to the Research Question

I am reluctant to say that I have definitively discovered the key variables that affect tree-planting decisions in Fondeblan. It is entirely possible and likely that I missed other key considerations. Furthermore, the correlations I have discovered may only be noting the effects of the previous project as opposed to causes for its success.
Finally, my non-random sample makes extrapolation beyond the sample speculative. Whatever the case, I am bound by the data I collected. While I will not come out with hard conclusions, I can cautiously extrapolate on each variable that generated significance in search of a sufficient answer to the research question.

Hypothesis five appears straightforward and generated the most statistical significance. If farmers already participate in agroforestry practices, then it makes perfect sense that they would continue to incorporate trees into their agroforestry practices. Further research needs to be conducted on agroforestry practices that existed in the area prior to Pwojè Pyebwa as well as project practices that are still in place.

The first outcome variable of unexpected statistical significance suggests that farmers who already posses a large number of different tree species on their land are likely to plant trees. It could be that these farmers have a large variety of tree species because they were initially receptive to the project, planted many trees, and continue to do so. It could be that there are a variety of different species of trees on their lands because trees factor high in their livelihood strategy, and a diversity of trees means to diversify one's livelihood strategy. Further research is needed to determine the nature of the correlation discovered.

The second outcome variable of unexpected statistical significance suggests that farmers are more likely to plant trees if they own several different types of animals; and that they are less likely to plant trees if they own only a few animals. A strong preference for selling animals over cutting trees was noted in the thesis. Such an economic activity not only pays more, but provides income much faster; charcoal-
making and plank-sawing take many days. It is not immediately clear why a higher ownership of different animal species is associated with a higher level of tree-planting. One possibility is that farmers with many different animals derive the majority of their income from those animals, and are not as occupied with or as dependent on crops. That is to say, they are vested in other livelihood strategies (animals) that leave their land open to the planting of trees. Another option is that farmers with multiple animals are planting trees to provide shade and fodder for their animals.

The third outcome variable of unexpected statistical significance indicates that farmers who rank trees as first or second in their overall livelihood strategies are likely to plant trees. This appears fairly straightforward—one continues to plant that which one makes a living from.

In answering the research question it appears that there are at least four factors which motivate farmers to continue planting trees, nearly 30 years after a major tree-planting project. These factors appear to be primarily economic and ecological. One might make the case that certain agroforestry practices are molded and shaped by cultural conceptions, though I did not gather data at a level to where I could ascertain such occurrences.

**Assessing Behavior and Land Changes**

While not explicitly stated as an objective of this research, assessing behavior and land changes has been an underlying theme throughout this thesis, as evidenced by their mention in the thesis title. Interestingly, Balzano did not notice many changes to hills of the area during his first return visit, 10 years after his departure, although he has noted changes to one of the major valleys (Bazano, personal communication 2010). Perhaps 10 years is not enough to truly gauge land changes. It has now been
approximately 14 years since his last visit, and approximately 30 years since Pwojè Pyebwa operations commenced.

Every key informant I talked to insisted that the land of the area has improved dramatically since the pre-project days. This observation, coupled with the near seven-fold increase of charcoal trucks leaving Fondeblan daily, suggests that substantial land changes have occurred. Otherwise, such an increase in charcoal might have registered visible changes to the hillsides of the area. Balzano has suggested that some of this increased is simply a perceived increase, due to charcoal trucks passing through Fondeblan from other areas (Balzano 2010, personal communication). However, I observed many charcoal bags for sale by the side of the road. One morning I observed different households bringing their charcoal to load on a truck which had intentionally stopped in Fondeblan for charcoal.

It is very possible that Pwojè Pyebwa trees have met a need that otherwise would have resulted in denudation of the hillsides in Fondeblan. According to Balzano, some of the charcoal needs are met by the rak bwa that existed prior to Pwojè Pyebwa (Bazano, personal communication 2010). Whatever the case, the area has certainly not become more deforested as charcoal production has increased. Finally, the case of land change can certainly be made with reference to the planting of 2 million trees, though this is an angle I have avoided in this research. Further research is needed to understand this and other land changes that may have been ushered in by the project.

If discrete land changes are hard to measure, even harder to measure are behavioral changes ushered in by the project. Furthermore, no strong claims to change can be made with a non-random sample. While Murray pointed out that most Haitians
rarely plant wood trees—though they may nurture volunteers—it is not immediately clear if this has always been the case in Fondeblan. One apparent behavioral change is that multiple farmers in Fondeblan claimed they are now willing to pay for wood trees. This claim by farmers was confirmed by a key informant, who was also quick to note that increases in the price of wood trees may have since rendered such claims null. That is, farmers may be thinking of prior prices when claiming to be willing to pay for wood trees. Murray posited that a farmer willing to pay for wood trees was a very unlikely scenario. This may be a phenomenon unique to Fondeblan. It is a question that needs further research.

Other behavior changes in the area have been suggested throughout this thesis, although it is uncertain to what extent they have been ushered in by the project. For example, there has been an apparent shift toward commodity commerce. Another example is that farmers in Fondeblan appear to be keeping fewer cattle than in previous periods. These two examples serve to highlight the difficulty in teasing out which behavioral changes are directly due to the project, which changes are indirectly due to the project, and which changes are not due to the project at all.

In summary, from the presence of several for-profit tree nurseries, farmers who indicated that they purchase seedlings, an increase in charcoal production in the area, and the presence of several carpenters making products from locally-produced planks, I conclude that farmers in the area are generating income from Pwojè Pyebwa trees. By extension, an increase in income is considered a valid measure of project success because income can improve one’s standard of living in multiple ways.
As a final qualitative statement, farmers in Fondeblan are not entirely homogenous and utilize a diversity of livelihood strategies, of which trees may play an important role. Differing interest in tree-planting is likely reflective of differing abilities to procure money from trees.

As would be expected, further research is needed in the formation of definitive claims. The final chapter of this thesis highlights steps forward for both further research and further tree-planting projects in Fondeblan.
Planners of future tree-planting projects in Haiti would be wise to consult the summary of findings from 20 years of tree-planting experiments during the latter decades of the 20th century (see Murray and Bannister 2004). In the case of Fondeblan, several revelations from exploratory research have generated the following suggestions for the future success of tree-planting projects in the area:

- First, while the original Pwojè Pyebwa design provided fast-growing species of commercial value, data from Fondeblan seem to indicate that trees with strong regenerative capacities do well. Therefore, I would suggest promoting trees that are also known to regenerate multiple times.

- Second, as the data indicated a strong tendency for those farmers practicing agroforestry to continue to plant trees, I would recommend matching tree-species that do well with agroforestry practices in use in the area.

- Third, as there was a strong correlation between farmers who make money from trees and tree-planting, I would suggest the promotion of trees that farmers feel will yield the highest profits.

- Fourth, as there was a tendency for tree-planting to increase with animal ownership, I would suggest that animal husbandry and animal distribution projects be developed in tandem with tree-planting operations. While animals may provide a buffer to tree-cutting, challenges remain—particularly with goats—in ensuring seedling survival.

- Fifth, CODEF has a new and fully functional saw mill that is collecting dust for lack funds and lack of an individual with the time and initiative to put the mill to work. As planks fetch a higher price than charcoal, the saw mill should be considered an important component of future tree-planting projects.

- Sixth, Haitian farmers should continue to be involved at all levels of future tree-planting projects, as they are experts in their own right.

- Finally, the presence of well-organized peasant cooperatives in the area was well noted, and should be considered in any future tree-planting project.
While these recommendations may be helpful to projects within the Fondeblan area, it is uncertain if they are applicable to all of rural Haiti with its heterogeneous landscapes and farmer livelihood strategies.

**Future Research in Fondeblan**

There are always ways to improve research. That is, there is no such thing as a perfect research design, because there are always new and innovative methods which are being tested and explored. Nevertheless, some key considerations for future research on tree-related issues in Fondeblan are given here:

- Future research in Fondeblan needs to be conducted over a longer period of time. Deeper relationships, deeper trust, deeper access, and by extension deeper understanding can only be established over a longer period of time. Furthermore, different farmer habits are practiced in different seasons, and these seasonal differences need to be observed.

- The sample size for future research should be increased, and random sampling needs to be employed to increase external validity.

- Use of modern tools such as GPS, GIS, and others should be employed to provide digital maps of the area. Such maps could be added to over time to clearly demonstrate ecological changes to the area.

- Other tools like social network analysis should be employed to note relationships between farmers, charcoal middlemen, carpenters, and others purchasers of wood products.

- Multiple methods need to be employed for proper triangulation in an effort to cross-check data. In particular, the relationship between the correlations discovered in this thesis need to be revisited and further researched.

- A comparison between Fondeblan and another area (of similar geographical conditions) that did not participate in Pwojè Pyebwa would be revealing.

- The species compositions of rak bwa need to be discovered and documented. The conditions that owners of rak bwa share in common need to be discovered. Whether or not Pwojè Pyebwa trees are being planted in rak bwa would be revealing.

- The role that remittances play in relation to the rak bwa needs to be discovered.
• Most importantly, local Haitians should to be involved at all levels of the research process for three reasons. First, local Haitians are local experts. Second, such an approach would provide employment and training in methods for these individuals. Finally, such experiences have the potential to be empowering.

I am certain that other recommendations for future research will reveal themselves to me as I continue in two more years of coursework before I conduct this research. I will continue to explore and experiment with appropriate methods up until the time I depart for two years of ethnographic field work in Fondeblan.

Rather fortuitously, the National Science Foundation has funded my research into the rak bwa of Fondeblan for the next three years. I am interested in looking at the relationship between the rak bwa and Pwojè Pyebwa, as Balzano noted their existence prior to the project’s commencement.
APPENDIX A
DEFINITIONS OF VARIABLES

1. **Age**: This discrete quantitative variable represents the numerical value of a head-of-household’s age, as reported by the head-of-household.

2. **Animal types**: This discrete quantitative variable lists the different types of animals owned by a household, as reported by the head-of-household.

3. **Crop types**: This discrete quantitative variable lists the different crops grown on the land owned or access by a household, as reported by the head-of-household.

4. **Literacy**: This dichotomous categorical variable represent whether or not heads-of-household are literate, as reported by heads-of-household.

5. **Livelihood ranking**: This ordinal variable recorded ranking of average annual income procured from trees, crops and animals. Rankings are from highest to lowest. Ranking was performed by the head-of-household.

6. **Number of children**: This discrete quantitative variable measures the numerical value of total children produced by the head-of-household.

7. **Number of different crops grown**: This discrete quantitative variable measures the numerical value of distinct types of crops grown per household, as reported by the head-of-household.

8. **Number of different trees on land**: This discrete quantitative variable measures the numerical value of distinct types trees on land owned or accessed by household, as reported by the head-of-household.

9. **Number of people per household**: This discrete quantitative variable measures the numerical value of people living at a particular household, as reported by the head-of-household.

10. **Number of uses for trees**: This discrete quantitative variable measures the numerical value of different uses for trees, as reported by the head-of-household.

11. **Number of different animals owned**: This discrete quantitative variable measures the numerical value of different types of animals owned by a particular household, as reported by the head-of-household.

12. **Other-land holdings**: This dichotomous categorical variable represents whether or not a household has ownership or access to more than one parcel of land, as reported by the head-of-household.

13. **Own land**: This dichotomous categorical variable represents whether or not a household owns land.
14. Ownership or access to rak bwa: This dichotomous categorical variable measures whether or not a given household has ownership of or access to, woodlots, as reported by the head-of-household.

15. Participation in project: This dichotomous categorical variable measures whether or not a household participated in Pwojè Pyebwa, as reported by the head-of-household.

16. Religion: This categorical variable measures the religion practiced by the head-of-household.

17. Remittances: This dichotomous categorical variable measures whether or not the household receives money from family members or friend living outside of Fondeblan.

18. Sex: This dichotomous categorical variable measures the sex of the head-of-household, as reported by the head-of-household.

19. Size of total land owned: This continuous quantitative variable measures the total size of land owned by a household, in hectares, as reported by the head-of-household.

20. Soil types: This categorical variable measures the type of soil on land owned or access by a household, as reported by the head-of-household.

21. Tree cutting: This dichotomous categorical variable represents whether or not the household cuts trees on their land, as reported by the head-of-household.

22. Tree planting: This dichotomous categorical variable lists whether or not a household currently plants trees on their land, as reported by the head-of-household.

23. Tree species on land: This nominal variable lists kinds of species on land owned or access by a household, as reported by the head-of-household.

24. Use of agroforestry practices: This dichotomous categorical variable lists whether or not the household utilizes agroforestry practices, as reported by the head-of-household or observed by the principal investigator.

25. Wealth: This dichotomous categorical variable measures whether or not a household is wealthy, by the presence or absence of a cement home. A previous study in the area measured wealth in a practical way—by presence or absence of a cement cistern. “Cistern ownership is a reliable indicator of economic status. These are usually expensive items being all concrete and fed with a system of gutters from all adjacent sheet metal roofs within the lakou. To have a cistern, one must be able to afford sheet metal roofing and concrete” (Balzano 1986: 32). Following this logic, but adjusting for the subsequent development of water projects and the capping and rerouting of the area’s major water source (Thomas
and Fendall 2003), I used the presence of a cement house as a proxy for wealth. That is, for the purpose of this variable, households residing in cement houses are considered wealthy, and those residing in mud or thatch houses are considered not wealthy.
## APPENDIX B
LOGISTIC REGRESSION AND CHI-SQUARE TESTS

### Variables in the Equation

<table>
<thead>
<tr>
<th>Step 1&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
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<td>1.327</td>
<td>.355</td>
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<td>.551</td>
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<td></td>
<td>CementHouse</td>
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<td>1.885</td>
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<td>.170</td>
<td>5.186</td>
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<td></td>
<td>NEWNumberOfTrees</td>
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<td></td>
<td>agroforestry</td>
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<td>6.443</td>
<td>1</td>
<td>.170</td>
<td>22.049</td>
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<td></td>
<td>NEWNumAnimal</td>
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<td>cuttrees</td>
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<td>2.727</td>
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<td></td>
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<td>newrankuse</td>
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<sup>a</sup> Variable(s) entered on step 1: literate, CementHouse, NEWNumberOfTrees, rakbwa, agroforestry, NEWNumAnimal, cuttrees, codef, newrankuse.

### Chi-Square Tests (rak bwa)

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
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</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
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<tr>
<td>Continuity Correction&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Likelihood Ratio</td>
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<tr>
<td>Fisher's Exact Test</td>
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<td></td>
<td></td>
<td>.093</td>
<td>.059</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>3.322</td>
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<td>.068</td>
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<tr>
<td>N of Valid Cases</td>
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</tr>
</tbody>
</table>

<sup>a</sup> 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.26.

<sup>b</sup> Computed only for a 2x2 table

### Chi-Square Tests (# of different trees)

<table>
<thead>
<tr>
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<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
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<td>Pearson Chi-Square</td>
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<td>.015</td>
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<td>Continuity Correction&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>Fisher's Exact Test</td>
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<td>.021</td>
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<td>Linear-by-Linear Association</td>
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</tr>
<tr>
<td>N of Valid Cases</td>
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</table>
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.79.

b. Computed only for a 2x2 table

### Chi-Square Tests (agroforestry)

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<tr>
<th></th>
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<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
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<td>Pearson Chi-Square</td>
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a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.56.

b. Computed only for a 2x2 table

### Chi-Square Tests (# of different animals)

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<th>Asymp. Sig. (2-sided)</th>
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<th>Exact Sig. (1-sided)</th>
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<tr>
<td>Fisher's Exact Test</td>
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<td>.018</td>
<td>.012</td>
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<td>.014</td>
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a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.20.

b. Computed only for a 2x2 table

### Chi-Square Tests (livelihood ranking)

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<th>Asymp. Sig. (2-sided)</th>
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a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.20.

b. Computed only for a 2x2 table
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Wilentz, Amy


White, Leslie


White, Thomas Anderson.


White, Thomas Anderson and Jon L. Jickling


Wolf, Eric

Zuvekas, Clarence Jr.

BIOGRAPHICAL SKETCH

Andrew Tarter was born in Okay (Les Cayes)—a city located toward the end of Haiti’s southern peninsula. He received his BA from the University of Washington’s Program on the Environment—an interdisciplinary environmental studies program. At the University of Florida, Andrew received an MA (2010) from the Department of Anthropology, under the supervision of Professor Gerald F. Murray. He is the recent recipient of a fellowship from the National Science Foundation (NSF), which will allow him to pursue a PhD in anthropology. His focus continues to be on Haiti, the wider Caribbean, and ecological anthropology.